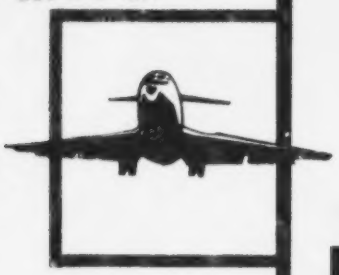
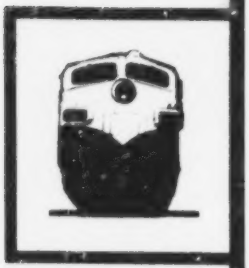
OCT 2 9 1981

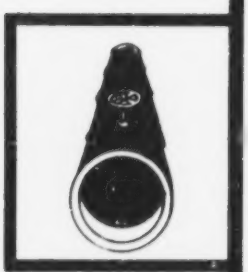
982-I-23

TD 1.120: MSS 81-1

COMPLETED
54







NATIONAL TRANSPORTATION SAFETY BOARD

ORIGINAL

WASHINGTON, D.C. 20594

SPECIAL STUDY

MAJOR MARINE COLLISIONS AND EFFECTS OF PREVENTIVE RECOMMENDATIONS

NTSB-MSS-81-1

UNITED STATES GOVERNMENT

TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. NTSB-MSS-81-1	2. Government Accession No. PB82-120205	3. Recipient's Catalog No.
4. Title and Subtitle Special Study--Major Marine Collisions and Effects of Preventive Recommendations		5. Report Date September 9, 1981 6. Performing Organization Code
7. Author(s)		8. Performing Organization Report No.
9. Performing Organization Name and Address National Transportation Safety Board Bureau of Technology Washington, D.C. 20594		10. Work Unit No. 3257A 11. Contract or Grant No. 13. Type of Report and Period Covered Marine Safety Special Study
12. Sponsoring Agency Name and Address NATIONAL TRANSPORTATION SAFETY BOARD Washington, D. C. 20594		14. Sponsoring Agency Code

15. Supplementary Notes
The subject report was distributed to NTSB mailing lists: 8A, 8G and 19.

16. Abstract

From 1970 through 1980, the National Transportation Safety Board investigated 82 major marine accidents. Thirty-three (40 percent) of these were collision accidents. The Safety Board initiated this study to examine a representative segment of ship collision investigation data based on the Safety Board's marine investigation experience. The study identifies some leading causes of ship collisions and assesses the results of the Safety Board's collision prevention recommendations made to Federal agencies and to maritime organizations.

The study found that human error is the predominant cause of ship collisions and that specialized marine accident data which underscore the human factor in the cause of ship collisions need to be collected. Many of the Safety Board's past recommendations aimed at improving steering gear reliability will be resolved as the Coast Guard implements U.S. steering gear regulations in consonance with the current IMCO revisions to the 1974 SOLAS Convention. The Inland Navigational Rules Act of 1980 is responsive to many of the Safety Board's recommendations to upgrade navigation rules.

The study recommends additional measures to increase the effectiveness of the ship's bridge watch team, and the collection of data concerning the human factors that contribute to the cause of ship collisions.

17. Key Words	18. Distribution Statement
encounter; collision prevention; navigation; steering reliability; maneuvering; VHF communication; visibility; simulator; waterborne commerce; vessel trip; human error; collision data; recommendation; investigation; collision avoidance system (CAS); Vessel Traffic Service (VTS)	This document is available to the public through the National Technical Information Service-Springfield, Virginia 22161 *(Always refer to number listed-in item 2)*

19. Security Classification (of this report)	20. Security Classification (of this page)	21. No. of Pages	22. Price
UNCLASSIFIED	UNCLASSIFIED	43	

NTSB Form 1765.2 (Rev. 9/74)

BEST DOCUMENT AVAILABLE

CONTENTS

INTRODUCTION 1

MARINE ACCIDENT INVESTIGATION/REPORTING CRITERIA 2
U.S. Coast Guard Criteria 2
Safety Board Criteria 3

DATA SOURCES AND DISCUSSION 4
U.S. Coast Guard Collision Data 4
Safety Board Collision Data 7
U.S. Waterborne Commerce Data 11

PAST SAFETY BOARD RECOMMENDATIONS 13
Recommendation Process 13
Navigation Rules (Rules of the Road) 16
Steering Reliability 17
Personnel Training 18
Bridge-to-Bridge Communications 18
Maneuvering 20
Vessel Traffic Services 21

LEADING CAUSES OF COLLISIONS 21
Improper Navigation 21
Steering Failure 23

DATA LIMITATIONS 24

CONSIDERATION OF ADDITIONAL COLLISION PREVENTION METHODS . . . 24
Effective Use of Radar 24
Simulator Research 25
Reducing the Effects of Restricted Maneuvering Room 25

CONCLUSIONS 26

RECOMMENDATIONS 26

LITERATURE CITED 29

APPENDIXES 33
Appendix A--Legend of Collision Synopsis Shown in Table 2 33
Appendix B--Safety Board Collision Prevention Recommendations 34

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C. 20594

SPECIAL STUDY

Adopted: September 9, 1981

MAJOR MARINE COLLISIONS AND EFFECTS OF PREVENTIVE RECOMMENDATIONS

INTRODUCTION

The growth of modern shipping has been accompanied by a rising annual number of ship accidents. From 1970 through 1979, 1/ there were 34,022 commercial vessel accidents in the navigable waters of the United States. The average number of accidents increased 7 percent annually during the period, from 2,582 accidents in 1970 to 4,665 accidents in 1979. (1) 2/ In a similar 10-year period, U.S. waterborne commerce (2) rose from 306 billion ton-miles in 1969 to 409 billion ton-miles in 1978. 3/ This represents an average increase of 6 percent annually, based on the mean yearly percentage change.

About 40 percent of the accidents per year in U.S. waters are collision accidents. The number of collisions increased from 1,093 in 1970 to 1,621 in 1979. Based on the mean yearly percentage change, collisions increased 5 percent per year over the 10-year period. The consequential loss of life, injuries to persons, and damage to vessels, property, and cargo increased in direct proportion to the number of collisions. From 1970 through 1979, ship collisions resulted in 446 deaths, 390 serious injuries, 593 vessels lost, $650 million in property damage, and an undetermined amount of damage to the environment. The 1975 collision tally was exceptional in that it rose 21 percent above the 1974 tally, despite a 3-percent decline in the overall year-to-year accident rate and a 3-percent decline in U.S. waterborne commerce, based on tonnage and ton-miles in the 2 years. The collision rate has increased from an average of 0.097 collisions per 1,000 vessel trips in 1969 to 0.166 collisions per 1,000 vessel trips in 1978. This is a 7-percent increase in the yearly collision rate of collisions per vessel trip.

The National Transportation Safety Board initiated this study to examine a representative segment of the ship collision investigation data developed in the Safety Board's marine accident investigations. Through the use of a synopsis of the collision data, the study identifies some leading causes of ship collisions and assesses the results of collision prevention recommendations made to maritime organizations and to Federal agencies. Nationwide collision data have provided an index of the U.S. collision trends and were useful in describing the magnitude of the collision problem in this study.

The Safety Board was involved in the investigation of a total of 82 marine accidents from 1970 through 1980. Of these, 33 (40 percent) were collision accidents. The investigations identified a broad spectrum of major accident causes and contributing factors, and the analysis of the evidence identified numerous safety issues. During the 11-year study period, the Safety Board issued a total of 640 marine safety recommendations to Federal agencies, pilot associations, and maritime organizations. Of these, 222 (35 percent) addressed the collision problem. Many recommendations, such

1/ All data periods refer to the fiscal year except where noted.
2/ Numbers in parentheses refer to source publication listed by number in Literature Cited on page 29.
3/ Net domestic and foreign waterborne commerce.

as those aimed at improving steering gear reliability and upgrading navigation rules, have already achieved positive, tangible results. Others are currently in various stages of implementation according to the addressees of the recommendations.

The collisions identified in this study are those involving the impact of a vessel with either another vessel, a floating object, or a fixed structure. This definition includes the analysis of vessel-to-vessel impacts, and vessel impacts with bridges, objects, and moored vessels (rammings). Eliminated from the study were these occurrences involving "contacts" with the bottom (groundings) and minor docking incidents.

The U.S. Army Corp of Engineers (COE) compiles the U.S. Waterborne Commerce data which include the number of vessel transits at 50 U.S. ports. The number of vessel transits based on the COE record of trips provides a suitable basis for discussing the magnitude of the collision problem. The measure of a ship's exposure to risk based on the number of voyages and port calls was validated in an extensive study of tank vessel casualties (3).

Transit data are chosen as a collision exposure index because they represent nearly all phases of vessel operation. The annual tallies of collisions are compared to the annual number of vessel trips in U.S. waters. The ratio of collisions per transit is the index of collision exposure used in this study.

A related Safety Board study (4) released in 1969 examined some of the causes of collisions involving radar-equipped vessels. That report documented the inadequacies of the radar observer's qualifications and included corrective recommendations. The Safety Board in 1972 also issued a special study of ship collisions (5) which emphasized the magnitude of the collision problem in U.S. waters and discussed the benefits of existing and proposed ship collision avoidance systems (CAS). The recommendations in the 1972 study were directed toward reducing navigational errors, establishing Vessel Traffic Service (VTS) systems, and inducing the cooperation of maritime organizations to broaden the use of CAS. The recommendations issued in both of these studies have been satisfactorily implemented. The present study examines the ship collision problem on the basis of the recurrence of major causes and the status of collision prevention recommendations made by the Safety Board to Federal agencies and maritime organizations. It also updates the Safety Board's collision investigation experience since 1972.

MARINE ACCIDENT INVESTIGATION/REPORTING CRITERIA

U.S. Coast Guard Criteria

The Coast Guard investigates vessel casualties reported in accordance with 46 CFR Part 4. Coast Guard regulations require that a marine casualty involving U.S. vessels navigating in any waters or foreign vessels navigating in U.S. waters be reported if it meets any of the following criteria:

(a) All accidental groundings and any intentional grounding which also meets any of the other reporting criteria or creates a hazard to navigation, the environment, or the safety of the vessel;

(b) Loss of main propulsion or primary steering or any associated component or control system, the loss of which causes a reduction of the maneuvering capabilities of the vessel;

(c) Material damage affecting the vessel's seaworthiness or fitness for service or route;

(d) Loss of life;

(e) Injury causing a person to remain incapacitated for a period of more than 72 hours; or

(f) An occurrence not meeting any of the above criteria but resulting in damage to property in excess of $25,000.

These regulations provide for Coast Guard investigation of all ship accidents which meet the reporting criteria. These investigations have the dual purpose of determining the causes of accidents and enforcing Coast Guard regulations. However, the Safety Board is a nonregulatory agency and investigates only a selected number of major marine accidents as described below.

Safety Board Criteria

The Safety Board was established in 1966 within the Department of Transportation and was given authority to investigate marine accidents by the Independent Safety Board Act of 1974 (Public Law 93-633). Prior to 1974, the Safety Board independently reviewed the Coast Guard's investigative reports of major marine accidents to determine the probable cause and to issue marine safety recommendations. However, the Independent Safety Board Act of 1974 provided for the investigation of marine accidents in accordance with regulations to be prescribed jointly by the Safety Board and the Secretary of the department in which the Coast Guard is operating. In 1978, the joint regulations (49 CFR Part 850 and 46 CFR 4.40) became effective. These regulations prescribe the procedures for the investigation of major marine casualties which occur on the navigable waters of the United States or which involve a U.S. vessel.

As provided in the joint regulations, the Safety Board may conduct an investigation of any major marine casualty within U.S. waters involving a vessel, except one involving only a public vessel, 4/ and any U.S. nonpublic vessel in international waters that results in:

(a) loss of six or more lives;
(b) loss of a mechanically propelled vessel of 100 or more gross tons;
(c) property damage initially estimated at $500,000 or more; or
(d) serious threat to life, property, or the environment by hazardous materials.

In most cases, the Safety Board will conduct the investigation jointly with the Coast Guard or will request the Coast Guard to investigate for the Safety Board under the terms of the Act. Occasionally, the Safety Board will conduct the investigation using its own rules of practice. In any event, the Safety Board makes an independent determination of the facts, conditions, circumstances, and cause or probable cause of each major marine casualty, and each accident involving a public and a nonpublic vessel.

The differences in procedures, report format, and general approach relating to marine accident investigation are a reflection of the two distinct agency missions of the Coast Guard and the Safety Board.

4/ As defined in 46 CFR 4.03-40, primarily a vessel owned by the U.S. Government.

DATA SOURCES AND DISCUSSION

U.S. Coast Guard Collision Data

A primary source of collision data which provides a valid measure of collision experience in U.S. waters is the U.S. Coast Guard's Statistics of Casualties. (1) This publication contains, among other data, a tabulated summary of the number of commercial vessel accidents and the Coast Guard's determination of the primary cause. The data basis is the accident investigation records compiled by the Coast Guard during the year. The summary includes accidents involving selfpropelled and nonselfpropelled commercial vessels, and the total number of collisions represents the collision experience in the navigable waters of the United States and for U.S. vessels worldwide. (The term "U.S. ship collisions" will be used to describe the data collectively). Not included in the data are those accidents involving only noncommercial vessels, recreational vessels, and certain public vessels. Table 1 is a compilation of this Coast Guard accident data for the 10-year study period.

Table 1 shows that the number of collisions in U.S. waters and collisions involving U.S. vessels have increased about 5 percent each year over the 10-year period. There was a 34-percent increase from 1975 through 1979 over the previous 5 years beginning in 1970. The total collisions in 1975 rose 21 percent over the total in 1974, although both the waterborne commerce (2) based on cargo tonnage and total marine accidents of all types declined 3 percent.

The losses associated with collisions are displayed in table 1 in terms of fatalities and property damage. Annual fatalities ranged from 20 to 40 for 7 of the 10 years, with peaks occurring in 1971, 1975, and 1977. The property loss figures include the sum of loss and damage to vessels, cargo, and other property. The trend of property losses generally followed the ship collision totals. The 5-year losses from 1970 through 1974 were $211 million, and from 1975 through 1979 were $439 million. The losses for 1975 were about 38 percent higher than the losses for 1974. The monetary losses do not include adjustments for inflation.

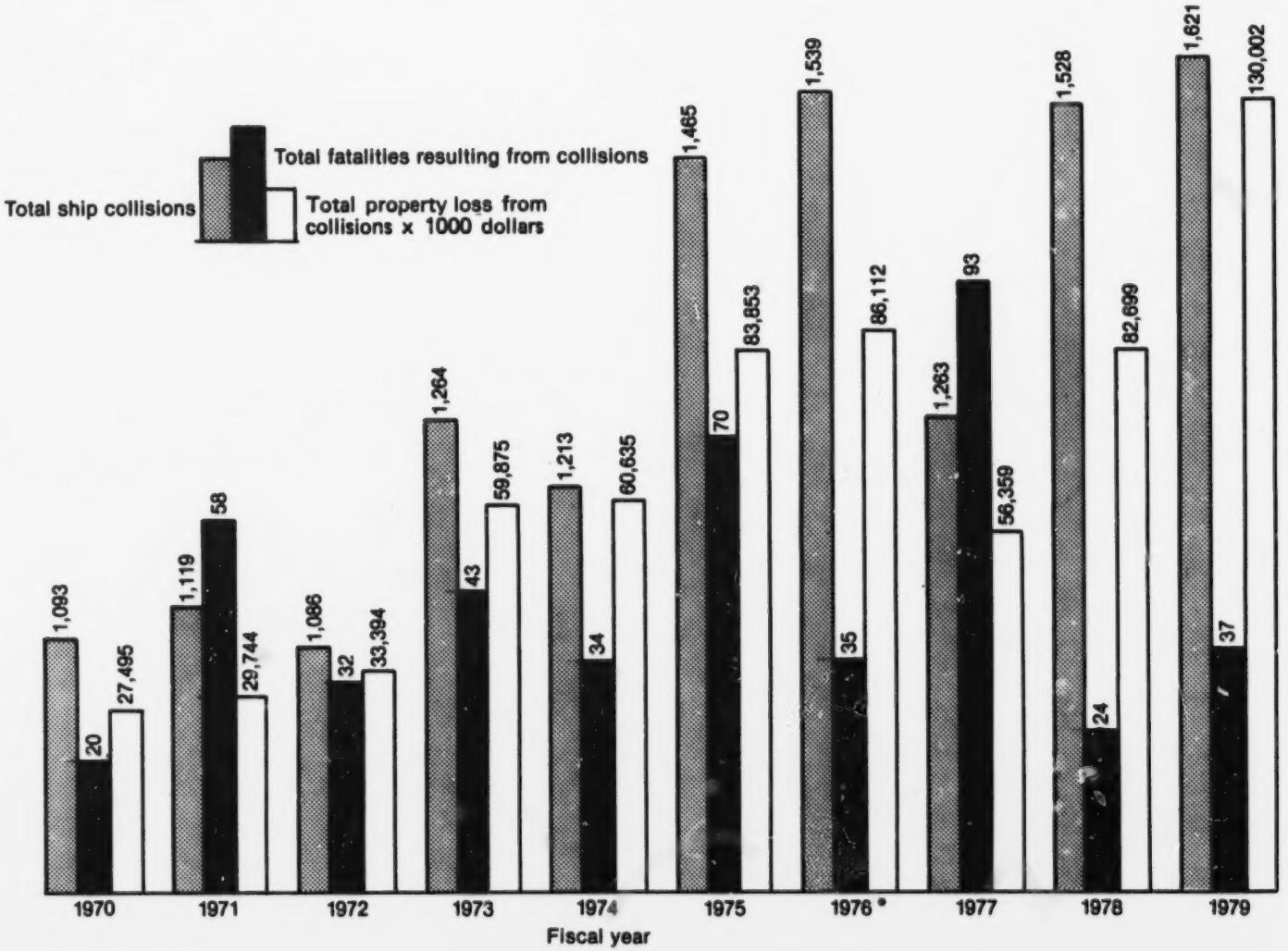
Table 2 contains the results of tabulating the U.S. ship collision data on the basis of the primary cause determined by the Coast Guard in each investigation from 1970 through 1979. A majority of ship collisions (66.5 percent) were caused by human error, followed by equipment failure (7.4 percent), collisions caused by floating objects and debris (7.2 percent), storms (5.8 percent), and collisions due to unknown causes (3.9 percent).

Development of further details concerning the specific human errors that resulted in ship collisions would require a detailed review of the Coast Guard's investigation files and the Form 2692 data. 5/ However, earlier studies which have been undertaken to determine the causes of ship accidents have concluded that ship navigational and maneuvering errors constitute the bulk of human error accidents. (6)(7) As a result, the effects of personnel error have been studied more extensively in recent years. The focal point of the human performance studies has been the duties of the pilot, master, or officer on watch.

A review of the available Coast Guard collision data identified in all cases the specific act, the person, or the circumstance that caused the collision, but the data

5/ The initial marine accident report form titled "Report of Vessel Casualty or Accident" which the operator of a vessel involved in a reportable accident is required to file with the Coast Guard.

Table 1.--Total ship collisions, fatalities, and damages in U.S. waters from 1970 through 1979.



Source: U.S. Coast Guard.

*1976 is a 15 month period including the transition quarter

BEST DOCUMENT AVAILABLE

Table 2.--Leading primary causes of U.S. ship collisions from 1970 through 1979.

PRIMARY CAUSE	Yearly Percentage (%)										Composite Percentage (%)
Human Error—Total	66	60	73	65	67	70	62	68	73	61	66.5
—Licensed of./Doc. Seaman	14	14	14	13	39	49	42	49	50	41	32.5
—Unlic./Undoc. Seaman	36	31	32	38	18	10	9	11	12	10	20.7
—Pilot State and Federal	10	15	15	8	5	4	5	4	7	6	7.7
—Other Person	6	8	12	5	5	7	5	5	5	4	6.2
Equipment Failure	5	7	7	4	5	10	11	8	9	8	7.4
Floating Debris/Object	12	11	9	9	9	3	6	8	6	4	7.2
Adverse Weather-Storm	6	8	8	7	6	6	6	4	4	3	5.8
Unknown-Insufficient Data	2	1	1	7	7	5	4	3	4	5	3.9
Other Causes	—	—	—	—	—	—	—	—	—	—	9.2
Yearly Collision Totals	1093	1119	1086	1264	1213	1465	1539	1263	1528	1621	—
Fiscal Year	1970	1971	1972	1973	1974	1975	1976*	1977	1978	1979	

*1976 is a 15 month period including the transition quarter

Source: U.S. Coast Guard

did not generally provide a scenario from which the human factors such as the navigator's commands, decisions, tasks, and responses could be identified and evaluated.

Safety Board Collision Data

From 1970 through 1980, the Safety Board issued accident reports covering 82 major marine accident investigations including 33 collision accidents. The reports cover a broad spectrum of issues. They also contain the detailed facts needed to examine safety problems and to develop and support marine safety recommendations. The data sample size encompassed by 82 accidents does not permit the development of significant trends. However, much of the data resulting from the investigations of collisions have been a definitive source for identifying major accident issues involving the human factor, the vessel factor, and the environmental factor.

Table 3 is a synopsis of the 33 collision accidents from 1970 through 1980 investigated by the Safety Board. The synopsis represents an inventory of the data contained in the Board's marine accident investigation files for the study period. Accident conditions are listed across the top of the table and the probable cause is listed near the right. The examination of how accident causes vary as a function of the prevailing conditions is one of the main objectives of this study. (A legend explaining the main entries in table 3 is given in appendix A.)

Examination of the data for major collisions (see table 3) reveals a wide spectrum of probable causes and contributing causes. To facilitate the examination of the recurring major causes, table 3 was divided into principal categories representing the leading major causes of ship collisions as determined by the Safety Board.

While there was great variability in the aggregate accident conditions, several common factors or circumstances were determined by the Safety Board to be the initiating cause of most collisions. From table 3, the leading causes of the marine collisions from 1970 through 1980 investigated by the Safety Board were:

Improper navigation -- A majority of the collisions (73 percent or 24 out of 33) resulted from improper navigation. Navigation includes the practice of determining, at any particular moment, the ship's position, speed, course, the time of encounter with approaching contacts, and the future courses to be steered to reach the desired encounter. This involves the use of radar, visual cues, whistle signals, aids to navigation, radiotelephone communications, and maneuvering data.

Equipment failure -- Steering and propulsion failures were identified as the occasion where this equipment malfunction was the first event that occurred in the collision sequence. These failures ranked second, resulting in 6 collisions for 18 percent of the total.

Other causes -- The remaining 9 percent of the collisions were the result of various causes, of which the most frequent cause amounted to less than 1 percent of the total.

Reduced visibility (less than 2 nmi) 6/ existed in 30 percent of the collisions, while there was moderate to clear visibility (2-10 nmi) in 70 percent of the collisions. A State

6/ Distances in this report are given in nautical miles (nmi).

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE

Table 3.--Synopsis of Safety Board marine collision investigations.

Date/ Time	NTSB Report Number	Vessel Type	Collision Conditions			Person Directing Movement			Navigation Conditions			Communication Conditions		Prevail. Rules	System Failure	Probable Cause	Contributing Causes
			Waterway	Weather	Collision Encounter	Pilot	Master	Other	VTS Avail.	VTS Partic.	Radar Used	VHF Used	Whistle Used				
12/19/79 2058	MAR-80-17 Pina/Mr. Pete	TKR/Tow	Miss. R.	Clear	Meeting	Pina		Mr Pete	Yes	Yes	No/No	Yes/Yes	No/No	Inland	No	Attempted improper meeting	Inadeq. lighting, no pass. agreement
1/28/80 2021	MAR-80-14 Blackthorn/ Capricorn	Cutter/ TKR	Tampa Bay, Fla.	Visibility 7 mi.	Meeting	Cap		Blackt. OOD	No	No	No/No	Yes/Yes	No/Yes	Inland	No	Failure to keep to proper side	No pass. agreement, failure to keep aware of traffic
6/18/79 1713	MAR-80-11 Exxon Ches./ Regal Sword	TKR/ Cargo	Atlantic O.	Dense Fog	Meeting		Both	–	No	No	Yes/Yes	No/Yes	Yes/Yes	Intl.	No	Improper use of radar	Excessive speed, poor navigation, improper turns
2/3/79 0400	MAR-80-10 P.D. Lena/ Gretna	Cargo/ Ferry	Miss. R.	Clear	Ramming	P.D.L.	–	–	Yes	No	No	No	No	Inland	Steering	Steering electr. failure	Lack of written emergency instr. to restore steering
2/25/79 0409	MAR-80-8 Mob. Vig./ Mar. Duv.	TKR/TKR	Neches R. Tex.	Visibility 10 mi.	Meeting	Both		–	No	No	No/No	Yes/Yes	Yes/Yes	Inland	No	Loss of control	Failure to use radar, ineff. VHF use
8/30/79 1712	MAR-80-7 Inca Tupac Yupen Qui	Cargo/ Barge	Miss. R.	Visibility 7 mi.	Ramming	I.T.Y.		–	No	No	No/No	No	No	Western	Steering	Steering electr. failure	Lack of redundancy, lack of anchor and steering watch
4/1/78 1756	MAR-80-5 Stud	Tow/Bridge	Berwick Bay, La.	Visibility 5 mi.	Ramming			Stud	Yes	Yes	No	No	No	Inland	No	Improper alignmt.	Inadeq. high water limits, inadeq. tow horsepower, inadeq. river info.
11/9/78 0840	MAR-80-4 Irene Lemos/ Mar. Just.	Bulker/ Bulker	Miss. R.	Patchy Fog	Meeting	Both		–	Yes	Yes	Yes/Yes	Yes	Yes/No	Inland	No	Poor pilot judgement, failure to move to extreme right	Failure to monitor pilot navigation
10/3/78 0420	MAR-80-3 Tex. Iowa/ Burmah Spar	TKR/TKR	Miss. R.	Clear	Overtaking	Both		–	Yes	Yes	No/Yes	No/Yes	No/No	Inland	No	Improper navigation	Misjudged rel. speed, violated inland rules, failure to use VHF
8/27/78 0340	MAR-79-16 Sea. Venta/ N. Maersk	Container/ TKR	Houst.-Galv. Chan. Tex.	Visibility 10 mi.	Overtaking	Both		–	Yes	Yes	No/No	No/No	Yes/Yes	Inland	No	Inaccurate eval. of rel. closing speed	–
12/4/77 0750	MAR-79-15 Ribaforada/ Tiarat	TKR/ Cargo	Miss. R.	Visibility 7 mi.	Ramming	Riba		–	Yes	Yes	No	No	No	Inland and Bends	No	Late turn, failed to monitor pilot navigation	Unfamiliarity with vessel, pilot fatigue
10/25/78	MAR-79-14 Miller/ Welcome	Research V./ Fishing V.	Puget S. Wash.	Haze	Overtaking			Mil/Wel	Yes	No	Yes/No	Yes/No	No/No	Inland	No	Bridge left unattended	Improper turn, failure to post lookout
1/15/78 0234	MAR-79-13 China Sea/ D'Amico	TKR/ Cargo	L. A. Harbor Ca.	Clear	Ramming	C.S.		–	No	No	No	No	No	–	Yes	Improper interp. of hand signals	Inadeq. control sys. design, inadeq. maint., inadeq. signal sys.

Table 3.--Synopsis of Safety Board marine collision investigations. (continued)

Date/ Time	NTSB Report Number	Vessel Type	Collision Conditions			Person Directing Movement			Navigation Conditions			Communication Conditions		Prevail. Rules	System Failure	Probable Cause	Contributing Causes
			Waterway	Weather	Collision Encounter	Pilot	Master	Other	VTS Avail.	VTS Partic.	Radar Used	VHF Used	Whistle Used				
3/4/79 0842	MAR-79-12 Starlight/ Marion	Cargo/Navy	Ches. Bay Va.	Visibility 800 yds.	Meeting		Star	F.M. CO	No	No	Yes/Yes	Yes/Yes	Yes/Yes	Int'l.	No	Failure to comply with pass. agreemt.	No radar plot, high closure rate
6/12/78 1107	MAR-79-11 Yellowstone/ Betoute	Bulker/ Cargo	Med. Sea	Fog	Meeting		Both	–	No	No	Yes/Yes	Yes/No	Yes/No	Int'l.	No	Improper use of radar	Excessive speed
2/9/78 0106	MAR-79-8 Anoc Sceptre	TKR/ Ramming	Houston Channel Tex.	Visibility 10 mi.	Ramming	A.S.		–	Yes	Yes	No	No	No	Inland	No	Bank effects and crosscurrents	–
12/29/79 1819	MAR-79-7 World Nob./ Penn. Getty.	Bulker/ Bulker	Ches. Bay Va.	Visibility 12 mi.	Meeting		Both	–	No	No	No/No	No/No	Yes/Yes	Int'l.	No	Unsafe maneuvering	Location of pilotage area
2/22/78 0907	MAR-79-6 L.Y. Spear/ Zephyros	Navy/TKR	Miss. R.	Visibility 6 mi.	Overtaking	Both		–	No	No	Yes/Yes	Yes/Yes	Yes/Yes	Inland	No	Loss of control	Failure of C.O. to recognize VSL swing, failure to reduce speed
10/20/76 0615	MAR-79-4 Frosta/ Prince Geo.	TKR/Ferry	Miss. R.	Visibility Unlimited	Crossing	Frost.		P.G.	No	No	Yes/No	Yes/No	Yes/No	Western Rivers	No	Deficient conning	Failure to slow or stop, alchohol impairment
10/20/78 2107	MAR-79-3 Santa Cruz/ Cuyamoga	Cargo/ Cutter	Ches. Bay Va.	Clear	Meeting	S.C.	–	Cuy CO	No	No	Yes/Yes	No/No	Yes/Yes	Inland	No	Improper left turn, deficient conning, failure to use VHF	–
7/28/77 0428	MAR-78-10 Sitala	TKR/ Ramming	Miss. R.	Clear	Ramming	S.T.	–	–	No	No	No	No	No	Inland	Steering	Steering gear failure	Inadeq. inspection, inadeq. design
1/7/78 2125	MAR-78-9 S. Viking/ Candy Bar	TKR/ Crewboat	Gulf of Mexico	Rain, Fog	Crossing	–	S.V.	C.B. Lic. Op.	No	No	Yes/Yes	No/No	No/No	Int'l.	No	Failure to keep proper lookout visually and on radar	Failure to sound for signal
2/24/77 0656	MAR-78-1 Marine Floridian	TKR/ Ramming	James R. Va.	Visibility 5 mi.	Ramming	M.F.	–	–	No	No	No	No	No	Inland	Steering	Inadeq. steering gear maintenance	Imprudent speed, alarm failure, lack of steering room watch
1/31/75 0025	MAR-77-2 Queeny/ Corinthos	TKR/ Ramming	Marcus Hook, Pa.	Visibility 5-10 mi.	Ramming	Queeny	–	–	No	No	No/No	No/No	No/No	Inland	No	Failure to turn safely	Failure to monitor pilot navigation, divided attention of pilot
1/18/74 1401	USCG/ NTSB MAR-77-1 Keytrader/ Bauna	Bulker/ TKR	Miss. R.	Fog	Meeting	Both	–	–	No	No	Yes/Yes	No/No	Yes/No	Inland	No	Attempted improper starboard passing	Imprudent speed, inadeq. radar eval., failure estabi. comm., inadeq. fog sig., failure to post lookout

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE

Table 3.--Synopsis of Safety Board marine collision investigations. (continued)

Date/ Time	NTSB Report Number	Vessel Type	Collision Conditions			Person Directing Movement			Navigation Conditions			Communication Conditions		Prevail. Rules	System Failure	Probable Cause	Contributing Causes
			Waterway	Weather	Collision Encounter	Pilot	Master	Other	VTS Avail.	VTS Partic.	Radar CAS	VHF Used	Whistle Used				
6/2/73	USCG/ NTSB MAR-75-6 Seawitch/ Esso Brus.	Container/ TKR	New York Harbor	Visibility 10 mi.	Ramming	S.W		–	No	No	No	No	No	Inland	Steering	Steering coupling failure	–
11/7/72 2149	USCG/ NTSB MAR-74-4 African Neptune	Cargo/ Bridge	Brunswick Ga.	Visibility 1 mi.	Ramming	A.N.	–	–	No	No	No	No	No	Inland	No	Helmsman error	Collateral duties of mate, location of steering indicators, improper maneuver
9/20/72	USCG/ NTSB MAR-74-2 Carolyn Wks.	Tug/ Bridge	Ches. Bay Md.	Storm	Ramming		Carol.	–	No	No	No	No	No	Inland	No	Failure to deploy anchor, failure to timely commence tow	Fatigue, fear of sinking
3/14/71 2210	Mar. 14, 1973 Ham. La. Salle	Tow/Tow/ Pleasure V.	Ohio R.	Visibility 4-5 mi.	Meeting		Both Tows	Pleasure Vessel Operator	No	No	No/No/No	No/No/No	No/No/No	Western	No	Failure to detect approaching tow failure to use whistle signal	Poor nav., inadeq. lighting, inadeq. understanding of rules
1/18/71 0140	Aug. 11, 1971 Ariz. Std./ Ore. Std.	TKR/TKR	San Fran. Bay, Ca.	Fog	Meeting		Both	–	No	No	Yes/Yes	No/No	Yes/Yes	Inland	No	Failure of: regulatory system, radar sys., whistle sys., harbor advisory radar system	–
12/7/68 1829	Jul. 7, 1971 White Adler/ Helena	Cargo/ Cutter	Miss. R.	Clear	Meeting	Hel.	–	W.A. CO	No	No	No/No	No/Yes	Yes/Yes	Inland	No	Improper left turn	Failure to sound danger signal, failure to slacken speed
4/6/69 1915	Dec. 22, 1970 U. Faith/ W. Doucet	Cargo/Tow	Miss. R.	Visibility 10 mi.	Meeting	U.F.		W.D.	No	No	Unk/No	No/No	Yes/Yes	Western	No	Failure to detect other vessel	Failure to sound danger signal
3/16/68 0340	Nov. 10, 1970 African Star/ Midw. Cities	Cargo/Tow	Miss. R.	Patchy Fog	Meeting	A.S.		M.C.	No	No	Yes/Yes	Yes/Yes	Yes/Yes	Inland	No	Failure to reach safe passing agreement	Lack of common VHF frequency, inadeq. surveillance, failure to take evasive action

or Federal pilot was directing the movement of one or both of the vessels in 70 percent of the collisions. A licensed watch officer, pilot or master was directing the movement of one or both vessels in 24 percent of the collisions, while a military officer was directing the movement in four of the six collisions involving a public vessel. Almost 40 percent of the collisions occurred in the Mississippi River. The remainder occurred in other U.S. and coastal waterways, except for five collisions which occurred in international waters. Vessel Traffic Service (VTS) was active, manned, and being used by one or both vessels in 21 percent of the collisions; many of the collisions occurred in areas where VTS had been planned or proposed but was not operating, and the remainder occurred outside a VTS area. Marine radar was in operational use on one or both vessels in 30 percent of the collisions, and was not in use in 70 percent of the collisions. The Inland Rules of the Road were in effect during most of the collisions (70 percent). The International Rules were in effect in 15 percent of the collisions, and the Rules of the Road for Western Rivers were in effect in 12 percent of the collisions. In 7 of 33 collisions, the accident occurred in the early morning during the 0400 to 0800 watch.

A composite of the prevailing conditions found in the Safety Board investigations led to the following profile of a major marine collision accident:

- Occurred during the 0400 to 0800 watch
- Clear visibility
- State or Federal pilot embarked
- Inland U.S. waterway
- Outside an active VTS area
- Radar not in operational use
- Inland Rules in effect
- No equipment failure

Equipment failure (steering gear and propulsion control) was involved in 18 percent of the collisions. Only one of these accidents involved propulsion control failure, the collision of the USNS SEALIFT CHINA SEA and the SS LORENZO D'AMICO. (See figure 1.) The predominance of human error in ship collisions found in the Safety Board data agrees generally with the U.S. collision data shown in table 2. The Safety Board concludes that reducing the percentage of human error accidents should be the major concern in the formulation of an effective collision reduction program.

U.S. Waterborne Commerce Data

The measure of collision exposure used in this study is the annual number of vessel trips based on U.S. port calls. Vessel trip data were obtained from the U.S. Waterborne Commerce publications of the U.S. Army Corps of Engineers (COE). (2) Among other data, these publications contain detailed information on the annual number of vessel trips in each U.S. port. The information is derived from reports of vessel entries and departures collected from about 50 major U.S. ports. The reports also contain an annual tally of the waterborne commerce activity on the basis of tons and ton-miles.

The COE compiles data for vessels carrying foreign and domestic cargo, vessels carrying passengers, tank vessels, towing vessels, and barge traffic. Waterborne traffic movements are required to be reported to the COE by vessels which are subject to the

BEST DOCUMENT AVAILABLE

Figure 1.--USNS SEALIFT CHINA SEA ramming of the SS LORENZO D'AMICO.

reporting provisions of the Rivers and Harbors Act of 1922 (33 USC 555). The area of reporting covers the majority of vessel traffic in U.S. waters and includes major ports in the U.S., Puerto Rico, and the Virgin Islands, the Great Lakes, U.S. coastal waters, Hawaii, and Alaska.

Vessel trip reports are generally submitted for vessel movement in one direction, so that a single trip is counted for each vessel using a particular waterway and traveling in a continuous direction, regardless of the number of stops made along the waterway. The trip data exclude public vessel traffic, recreational and commercial fishing vessels, utility and harbor craft, and vessels traveling in U.S. waters but not destined for U.S. ports. The exclusion of these vessels from the trip data was not deemed significant to the results of this study.

Table 4 is a summary of the annual U.S. waterborne commerce from 1969 through 1978. It shows that the net U.S. waterborne commerce based on cargo tonnage and ton-miles increased steadily about 4 percent and about 6 percent per year, respectively, from 1969 through 1978. The increase from 1974 through 1978 was about 17 percent above the previous 5-year period. There were slight decreases in tonnage and ton-miles in 1971, 1974, and 1975. It is the number of vessel trips based on reports compiled by the COE Waterborne Commerce Statistics Center in New Orleans, Louisiana, however, which provides a measure of vessel exposure to a collision. The average annual number of trips in U.S. ports decreased about 1.4 percent per year from 1969 through 1978.

PAST SAFETY BOARD RECOMMENDATIONS

Recommendation Process

One of the Safety Board's most important functions is the development of safety recommendations to prevent the recurrence of similar accidents. The recommendations are directed to Federal agencies, pilot associations, and other maritime organizations.

As a result of collision investigations and collision studies from 1970 through 1979, the Safety Board made 222 recommendations. The status of these is listed in table 5 by addressee and in more detail in table 6 by topic. Of the 222 recommendations, 190 were addressed to the Coast Guard. The remainder were addressed to the National Weather Service, U.S. Army Corps of Engineers, American Bureau of Shipping, various local pilot associations, and numerous other organizations. The Coast Guard has begun or completed action that is acceptable to the Safety Board in 65 percent of the recommendations directed to that agency.

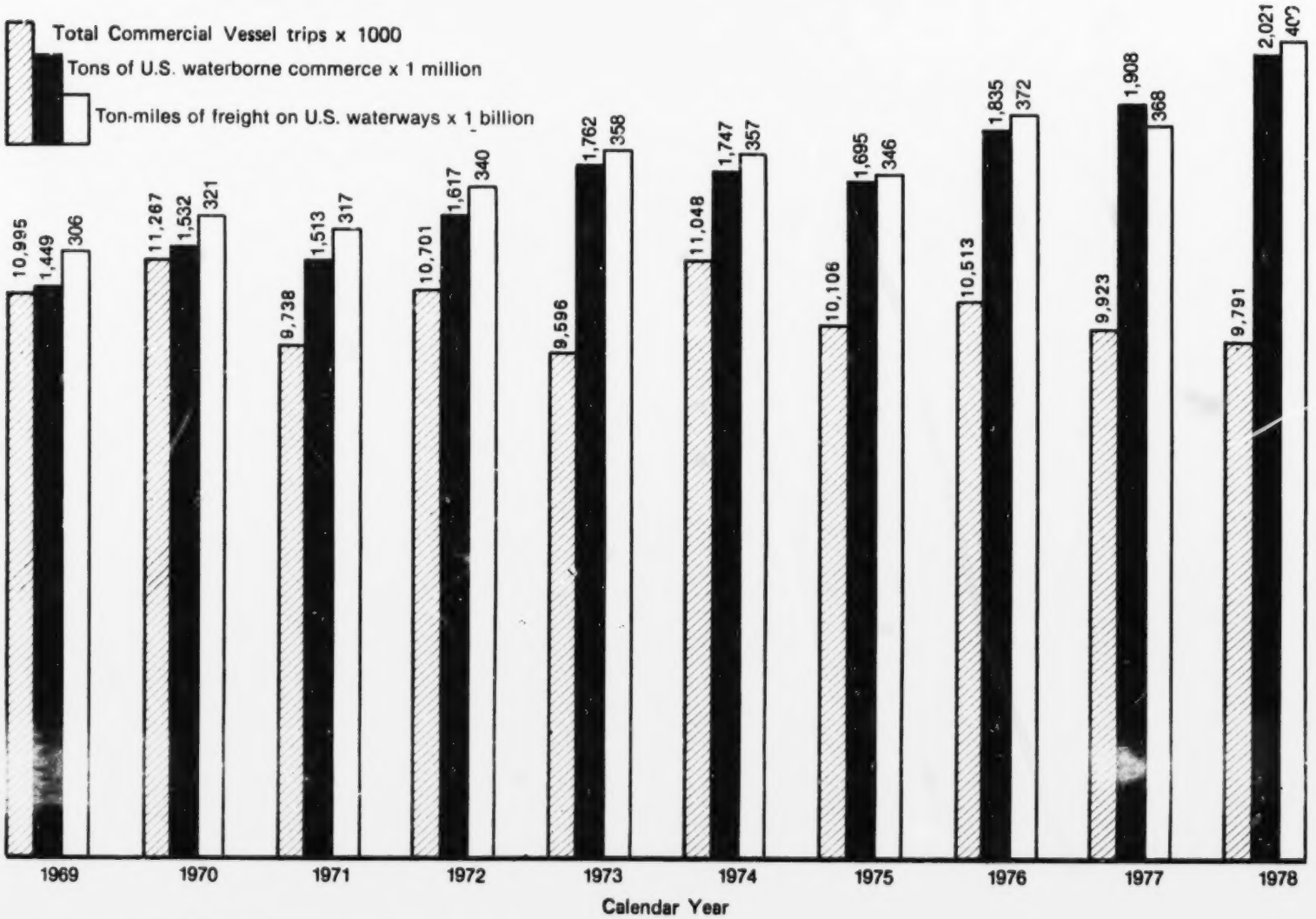
Table 5.--Status of collision prevention recommendations issued from 1970 through 1979. 1/

Addressee	Open Number	Open Percent	Closed Number	Closed Percent	Awaiting reply Number	Awaiting reply Percent	Total
Federal agencies	107	56	83	44	0	0	190
Maritime organizations	2	17	9	75	1	8	12
Pilot associations	1	5	3	15	16	80	20
Totals	110	49	95	35	17	8	222

1/As of August 14, 1981

BEST_DOCUMENT_AVAILABLE

Table 4.--Total commercial vessel trips, tons, and ton-miles in U.S. waters from 1969 through 1978.



Source: Waterborne Commerce Statistics of the U.S.

Table 6.--Status of collision prevention recommendations by topic.

Topic 1/	Total issued	Closed					Open			
		AA	AAA	UA	R	NLA	AA	AAA	UA	AR
Personnel										
Licensing	1						1			
Qualifications/training	15	1		1			8	1	4	
Physical fitness	7	1					3	1	1	1
Master/pilot relationship	7	1						1	2	3
Manning	4						3		1	
Vessel Operations										
Operating procedures	21	1	2	1	1	1	1		9	5
Maneuvering	4	1			1		2			
Waterway	8	1		2			4	1		
Navigation Rules										
Steering/sailing rules	11			1			3	1	3	3
Bridge-to-bridge radiotelephone	13	3				2	1	2	2	3
Ship's whistle	4						2			1
Navigation lights	10	4					3		2	1
Speed	6						3		3	
Ship Design										
Hull and mechanical modifications	25	6	1	2	1	1	8	2	3	1
Steering gear reliability	21	2		3			11		5	
Ship data recorders	2						2			
Navigation Aids										
Vessel Traffic Service	24	4		1		2	14		2	1
Radar	4	1				1	1		1	
Charts/data	3						3			
TOTALS	190	27	3	11	3	7	73	9	38	19

1/ Recommendations were screened to exclude areas such as lifesaving, firefighting, and other factors not directly involved in collision avoidance.

BEST DOCUMENT AVAILABLE

The Safety Board monitors the implementation progress of all recommendations. Because of the intermediate stages of recommendation followup, there are a number of recommendations for which satisfactory implementation is in process, but which are still shown as "open." The definitions below identify the various categories used by the Safety Board for followup recordkeeping and are illustrated in more detail in table 6:

1. Open--A recommendation which has not been closed by formal Board action. Either followup action by the Board or further responsive action by the addressee is indicated.

2. Closed--A recommendation for which followup action is no longer required.

3. Awaiting Reply (AR)--An initial response has not been received from the addressee.

4. Acceptable Action (AA)--The addressee has identified a plan or has implemented a program which will satisfy the recommendation.

5. Acceptable Alternate Action (AAA)--The addressee has identified an alternate plan or program which will satisfy the recommendation.

6. Unacceptable Action (UA)--The addressee has indicated he does not plan to implement the recommendation. The Board may continue to follow up or may close the recommendation.

7. Reconsidered (R)--The addressee has demonstrated with supporting rationale that the recommended action is unnecessary.

8. No Longer Applicable (NLA)--Circumstances have changed to the extent that recommendation followup is no longer warranted.

Table 6 lists recommendations by topic and by category. These recommendations are directed toward correction of the entire spectrum of safety problems identified during the Safety Board's marine collision investigations. Included in this spectrum are the recommendations aimed at reducing accidents caused by human error which account for five of the six major recommendation categories.

Navigation Rules (Rules of the Road)

The Safety Board's early recommendations for actions to improve the navigation rules resulted from the investigation of the AFRICAN STAR collision with the towboat MIDWEST CITIES (8) in the Mississippi River on November 10, 1970. Among other issues, this accident demonstrated the need for clarification of the relationship of the "Points and Bends" custom, carried over from the Western Rivers rules, and the Narrow Channel Rule, when the Inland Rules were placed into effect in the lower Mississippi River. The Safety Board found the accident was caused by the failure of the vessels to reach a passing agreement because of the improper exchange of whistle signals by the vessels. Neither could communicate on the other's VHF frequency, and both failed to take evasive action when they were in extremis.

During the study period, a total of 44 recommendations were issued directed to substantially modifying the Inland Rules of the Road and obtaining certain clarifications to the Western Rivers Rules, and changes to the International rules. The recommended modifications included requiring prompt whistle signals in consummating maneuvering agreements, establishing minimum distances for the timely exchange of the

required navigational data, requiring vessels to proceed at safe speeds for existing conditions, permitting the giveway vessel in encounter situations to initiate early evasive action when appropriate to avoid in extremis situations, and removing certain ambiguities in towing vessel light configurations.

In 1980, the Safety Board submitted testimony in support of the Congressional consideration of HR 6671, a House of Representatives bill to unify the rules for preventing collisions on the inland waters of the U.S. The provisions of this bill closely paralleled to those of the International Rules of the Road (72 COLREGS) which became effective on July 15, 1977. As enacted, HR 6671 integrated the Inland Rules, the Western Rivers Rules, and the Great Lakes Rules into one set of rules identified as the Inland Navigation Rules Act of 1980 and will become effective on December 24, 1981. Implementation of the new unified rules will resolve seven specific Safety Board recommendations aimed at upgrading the navigation rules.

Steering Reliability

In response to the Safety Board's recommendations and because of general concern for improving maritime safety, there has been considerable progress (9) in upgrading the U.S. and international steering gear requirements. Specifically, the investigation into the collision of the U.S. tankship MARINE FLORIDIAN (10) resulted in a recommendation that the Coast Guard amend 46 CFR 111.80-70(f)(1) and (2) to require steering failure alarms for monitoring the ship steering performance. Also, when the French tankship SS SITALA (11) collided with moored vessels after a steering failure on July 28, 1977, the Safety Board recommended reductions in the acceptable elapsed time (1) that the actual rudder position would be permitted to lag from the ordered rudder position before triggering the steering failure alarm, and (2) before restoration of steering control in emergencies.

The actions of the Coast Guard and the Intergovernmental Maritime Consultative Organization (IMCO) have been responsive to these recommendations in that recent amendments to the provisions of the 1974 Safety of Life at Sea (SOLAS) Convention contain substantial revisions to the steering gear requirements. The international steering gear requirements are outlined in the SOLAS 1974 Convention, Chapter II-1, Part C, Regulations 29 and 30. As amended, Annex 1 of regulation 29 now requires audible and visual alarms to signal the loss of electrical power to the steering gear power units. Also, there are specific design requirements for hydraulic piping, pumps, and power units that will meet specific Safety Board recommendations. In summary, the amendments require that the systems be designed to permit isolation of a failed component and to permit the operator to promptly restore lost steering using an alternate control path or component.

The Coast Guard is currently developing amendments to 46 CFR Subchapter J (Electrical Engineering Regulations) and expects to propose a requirement for steering failure alarms for new U.S. tank vessels and for existing tank vessels after a specified transition period. The Coast Guard also plans to require various equipment failure alarms and alternate power sources for vital electrical components. The Institute of Electrical and Electronic Engineers standards will continue to be used as a possible guide to govern the size and design of electrical hardware such as steering circuit cables, and electric steering motor specifications. The rulemaking proposal is scheduled for issue in late 1982. The new U.S. steering gear regulations are currently scheduled to become effective coincident with the international regulations on September 1, 1984.

The Safety Board recommendations to require manning of the steering engineroom in appropriate situations have not met with the same degree of acceptance by other maritime nations as the other steering reliability recommendations. The Safety Board's investigation of the collision of the SS SEAWITCH and the ESSO BRUSSELS, (12) and the

BEST DOCUMENT AVAILABLE

INCA TUPAC YUPANQUI and the PANAMA CITY (13) clearly indicated the merits of manning the steering compartment while in congested waters. In both of these accidents, the failure to assign personnel to the steering compartment precluded prompt recovery of steering by alternate means after the primary steering capability was lost. Some of the main arguments against requiring steering compartments to be manned have focused on: (1) the impracticability of enforcement of such a regulation, (2) the inadequacy of personnel training, and (3) the better alternatives that sufficient redundant hardware could provide.

By reason of the IMCO rejection of the U.S. proposal for manning emergency steering stations, the Coast Guard is now considering the benefits of specific redundant hardware with proven reliability, as well as the requirements for presailing tests of the vital navigation systems as a regulating alternative to manning the steering compartment.

Personnel Training

The number of accidents due to human error together with the trend toward smaller crews and greater automation of ships suggest that providing ship crews more thorough training in vessel equipment, waterways, and operating procedures would result in significant safety benefits. Proposals to prevent collisions by upgrading the training, qualifications, and physical fitness of ship personnel have been recommended by the Safety Board 14 times. Five of these recommendations were aimed at upgrading mariners' radar observer qualifications by strengthening the examination and training methods. Four recommendations addressed the need to improve the safety of operating and training procedures aboard Coast Guard vessels. Finally, in collisions where physical fitness was determined to be a factor, one recommendation proposed that the relationship between the effects of fatigue and human error be determined, two safety measures recommended the establishment of acceptable duty and rest periods for pilots, and one measure recommended requiring minimum physical standards for pilots. The remaining recommendation proposed a VTS indoctrination program for mariners.

The recommendations issued for improving the performance of ship personnel remain in various stages of implementation. Two recommendations for upgrading radar observers' qualifications have been closed and three remain open. Of the recommendations directed to the training of Coast Guard personnel, two are closed and two remain open. The recommendation to determine ways in which fatigue may contribute to human error remains open. Both recommendations for establishing acceptable duty and rest periods for pilots remain open. The Coast Guard has initiated recent rulemaking to require annual physical examinations for Federally licensed pilots. This action is commendable, but there is still a need to upgrade the physical standards for State pilots.

Bridge-to-Bridge Communications

To reduce accidents resulting from navigational encounters involving uncertainty about the other vessel's intentions, the Safety Board has issued 13 recommendations directed toward increasing the effective use of the VHF bridge-to-bridge radiotelephone. The Safety Board found that ineffective communication was either a causal or a contributing factor in 7 out of 33 collisions. (See table 3.) VHF communication problems ranged from the failure to keep a listening watch to the failure to transmit timely navigational intentions to the lack of a VHF communication requirement. One of the 13 proposed safety measures concerning VHF resulted from the investigation of the collision of the EXXON CHESTER and the REGAL SWORD (14) and the collision of the YELLOWSTONE and the IBN BATOUTA (20). (See figure 2.) In the latter investigations, the Safety Board recommended that the U.S. delegation to IMCO propose the adoption of

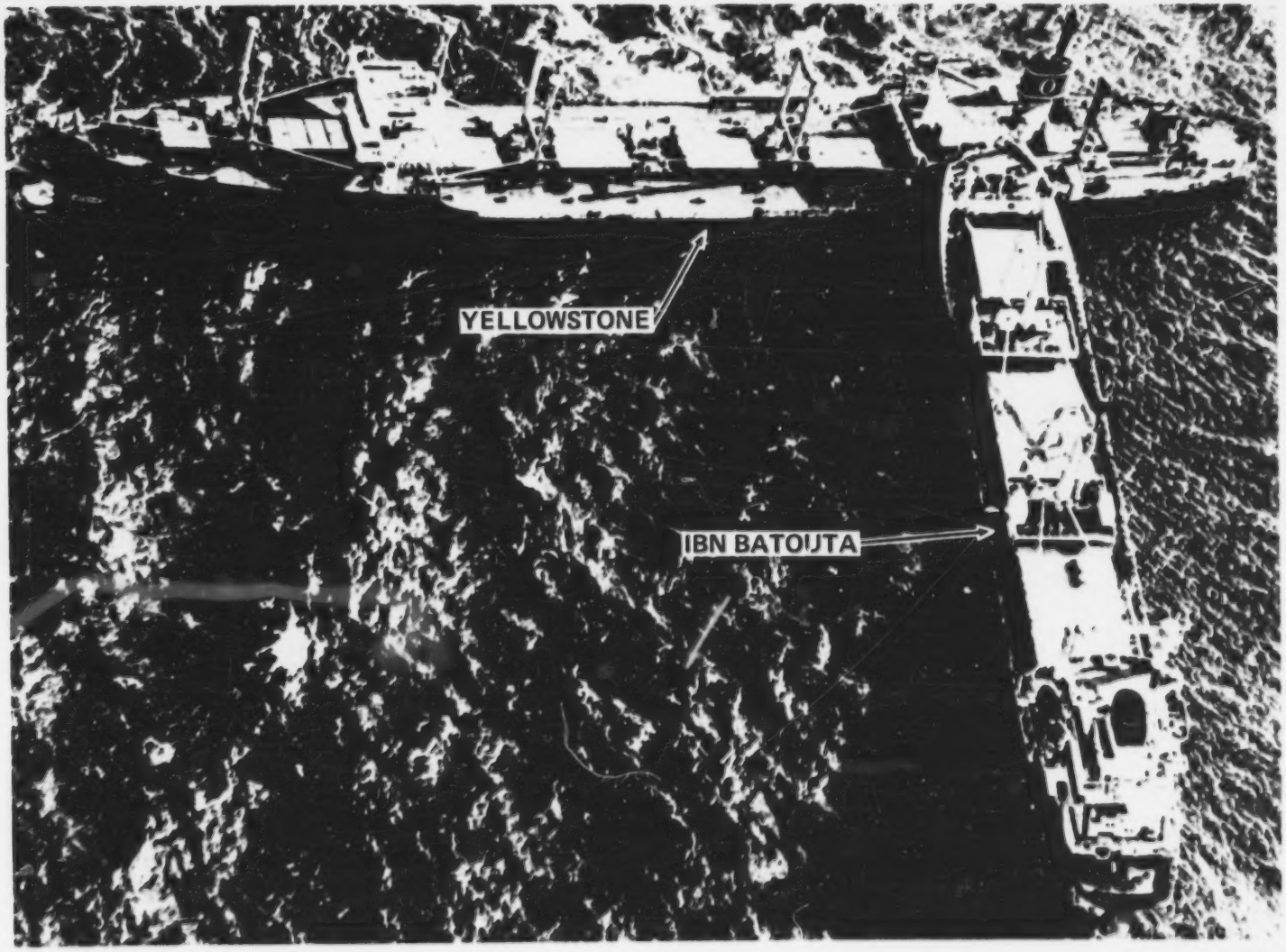


Figure 2.--Collision of SS YELLOWSTONE and M/V IBN BATOUTA.

BEST DOCUMENT AVAILABLE

a worldwide VHF channel to be required for use during ship encounters in international waters. The Coast Guard has submitted these proposals to IMCO for consideration.

Maneuvering

One of the classic examples of a ship collision that demonstrated the consequences of improper maneuvering as well as the importance of teamwork between the master and pilot was the EDGAR M. QUEENY and the SS CORINTHOS collision (15) on January 31, 1975, at Marcus Hook, Pennsylvania. The Safety Board determined that the QUEENY pilot's failure to safely execute a turn was compounded by the master's delay in assuming control of the vessel, despite the master's early uncertainties about the success of the turning maneuver. Analysis of the evidence has indicated that often the reason for improper manuevering was either the pilot's lack of familiarity with the vessel, the master's lack of familiarity with the waterway, or a poor pilot-master relationship. The basic issue of master or pilot qualifications has rarely been significant. The Safety Board has issued seven recommendations directed toward improving master-pilot relationships, three recommendations to increase the availability of local waterway data to mariners, and four recommendations to improve the mariner's knowledge of the ship's maneuvering characteristics.

Pilot organizations and others are sensitive to the advantages of an improved pilot-master relationship. One company has formalized a procedure to provide for improved master/pilot information exchanges. The procedure includes obtaining feedback from pilots, establishing priorities concerning decisions on delayed sailing, and maintaining current pilot training and familiarization. A research study (16) has proposed the use of standardized formats for presenting clear, concise ship maneuvering data for practical use by pilots and deck officers. The three standardized formats examined in the above study are:

1. Pilot Information Card
2. Posted Bridge Diagram
3. Shipboard Maneuvering Outline

Versions of these formats have been presented to a broad segment of the maritime industry and have received favorable response. One of the salient features of the format is the ready identification of the forces that will affect the vessel's turning and stopping distances. These forces include shallow water effects, cushion and suction effects, environmental effects, and the more familiar effects such as propulsion, steering, and anchoring (maneuvering data). Normal avoidance maneuvers can be ineffective in restricted waters because of the effects of shallow water or cushion and suction forces. In collisions and "near collisions," 8/ the unpredictability of shallow water effects often reduces the navigator's margin for error.

The Safety Board's recommendations regarding making maneuvering data more readily available resulted in the posting of basic turning and stopping data in the ship's wheelhouse. The implementation of measures to improve master/pilot relationships and to disseminate simplified ship's maneuvering data also would be responsive to the Safety Board's recommendations in this area.

8/ Simulator researchers have identified as "near collisions" those ship encounters that pass within a shiplength or less, or those that produce an uncomfortable safety margin.

Vessel Traffic Services

A number of studies to determine the causes of ship collisions have dealt with the issue of Vessel Traffic Services (VTS). However, in this study the Safety Board examined VTS only on the basis of determining whether the vessels were actively participating in VTS or whether the location of the accident was within a VTS area. Since 1970, the Safety Board has issued 24 recommendations directed toward improving the effectiveness of VTS. The majority of these recommended the establishment of either a VTS or traffic controls such as one-way traffic, speed limits, and no-passing zones to reduce the navigational hazards in congested waters. Three recommendations proposed mandatory participation in the Houston-Galveston VTS and the New Orleans VTS. The Coast Guard had previously studied many U.S. ports and elected not to establish an active manned VTS in some cases but has implemented a lower level of service. The Safety Board issued three recommendations that such VTS levels be reevaluated for possible upgrading for Tampa Bay, Florida, and for the Chesapeake Bay area, Virginia. Also, the implementation of VTS regulations or guidelines have been recommended for three existing systems.

Since the issuance of the Safety Board's recommendations, the Coast Guard has taken several actions which have upgraded VTS installations. The establishment of a VTS and implementation of traffic separation schemes in the San Francisco Bay area, the implementation of VTS regulations in the Chesapeake Bay, the development of VTS guidelines by the Sabine Pilots Voluntary Traffic Control System for the vicinity of Port Neches, Texas, and the provisions for one-way traffic situations in certain VTS areas are examples of such actions. Sixteen of the Board's 24 recommendations directly relating to VTS are either under consideration or under implementation and still remain open.

In order to identify the collision prevention potential of a VTS, the numerous variables associated with each collision, as well as the possible levels of traffic control within each VTS should be considered. Studies by the Coast Guard (7) and the Safety Board (8) have concluded that vessel traffic management systems such as separation lanes, the elimination of fine crossing traffic patterns, radar traffic surveillance, and vessel movement reports could definitely reduce specific types of accidents. The VTS studies accomplished by the Coast Guard and by foreign maritime authorities have recently concluded that VTS can provide a higher level of safety and efficiency when tailored to meet the needs of a given waterway. The Safety Board believes that the use of VTS with the pilot or watch officer as the responsible point of contact for monitoring communication, in coordination with the effective use of VHF communications and aids to navigation, has the potential to alleviate certain types of ship collisions.

LEADING CAUSES OF COLLISIONS

Improper Navigation

The fact that 21 percent (7 out of 33 collisions) investigated by the Safety Board resulted from the improper use of navigational radar as the probable cause or as the contributing cause indicates that more effective use of this equipment is needed. (See table 3.) The Safety Board has commented extensively on the irony of "the radar-assisted" collision problem in a previous study report (4) which outlined some of the major problems in the use of radar that contributed to ship collisions and offered specific recommendations for corrective action. To overcome the shoreside problems, the Safety Board noted the inadequacy of harbor radar systems and the need to establish traffic separation schemes (TSS); the shipboard problems included the need to upgrade radar observer qualifications, and inadequate VHF communication procedures. Recommendations were made regarding these matters and all of these have been implemented.

There are conflicting views on whether radar is inducing a false sense of security on the part of watch officers by encouraging greater vessel speeds in restricted visibility and by fostering the tendency to not keep a proper lookout. Some authorities believe that navigators place too much reliance on radar, while others believe the problem is that radar observations are not used properly. The case against relying on ship's radar has been made by a Royal Institute of Navigation study which was conducted at the London Shell Centre in 1977. (19) In commenting on the results of a simulation study to determine the benefits (or hazards) of radar, the researchers indicated that some vessel operators were not aware of the limitations of radar equipment. The operators tended to increase their incidence of unsafe maneuvering when they encountered a large quantity of radar data. The main criticism was that they accomplished small, ineffective course changes after assessing only a small amount of the available data. This was an example of misinterpretation of the radar data. The study conceded that, despite the possibility of faulty interpretation, shipboard radar could improve a watchkeeper's knowledge of developing situations and could reduce his workload substantially. The study also concluded that personnel training in shiphandling was most significant in reducing collisions.

Recently promulgated Coast Guard regulations will require certain vessels in U.S. waters to have automatic radar plotting aids (ARPA) 9/ installed by July 1, 1982. These aids will be incorporated into the vessel's radar system to assist the watch officer in evaluating the potential danger of approaching targets and in planning evasive action if required.

Three of the Safety Board's collision investigations have demonstrated the need for additional training to interpret radar navigational information. Investigation of the collision of the EXXON CHESTER and the REGAL SWORD, on June 18, 1979, in the Atlantic Ocean (14), the collision of the IBN BATOUTA and the SS YELLOWSTONE on June 12, 1978, in the Mediterranean Sea (20), and the collision of the KEYTRADER and the BAUNE on January 18, 1974, in the Mississippi River (21), revealed evidence of the "false security" syndrome. The EXXON CHESTER, the YELLOWSTONE, and the BAUNE were determined to have been traveling at excessive speeds in fog, in reliance on the vessel's radar. All three accidents were caused primarily by the watch officer's failure to properly interpret the radar data. To eliminate this type of accident, the Safety Board issued four recommendations directed toward improving radar observer qualifications and upgrading the pilot or watch officer's license criteria by requiring more frequent examinations on the operation of radar and interpretation of radar data.

The number of collisions in clear visibility (2-10 nmi) continues to be a problem. As shown in table 3, the cause has frequently been attributed to improper meeting, crossing, or overtaking maneuvers. These collisions included the failure to reach an agreement regarding the desired encounter (steering and sailing rules), unsafe maneuvering based on the ambiguity or the lack of whistle signals or the lack of VHF communications (faulty communication), and the initiation of dangerous ship maneuvers, or unexpected vessel response to existing waterway conditions (improper maneuvering).

Three of the most notable of the 14 accidents that resulted from improper navigation in clear visibility were the collision of the USCG Cutter CUYAHOGA and the SANTA CRUZ II, on October 20, 1978, in the Chesapeake Bay (22), the collision of the USCG Cutter BLACKTHORN with the SS CAPRICORN on January 28, 1980, in Tampa Bay (23), and the collision of the Ferry GEORGE PRINCE with the SS FROSTA on October 20, 1976, in the Mississippi River (33). These accidents resulted in a total of 122 fatalities.

9/ "ARPA" has replaced the "CAS" nomenclature associated with shipboard radar equipped to automatically present the proximity of an encounter with an approaching vessel.

BEST DOCUMENT AVAILABLE

The safety issues in these accidents included: (1) the failure to establish timely VHF bridge-to-bridge communications, (2) uncertainty concerning the responsibilities under the applicable Rules of the Road, and (3) the lack of an active, manned VTS. Both the BLACKTHORN and the CAPRICORN attempted unsuccessfully to establish VHF bridge-to-bridge communications, but neither vessel sounded whistle signals as required by the rules until they were in extremis. The Safety Board determined that the tug OCEAN STAR, which was broadcasting on a high-powered VHF radiotelephone setting at the same time, may have overpowered both the BLACKTHORN's and the CAPRICORN's radios. Neither the CUYAHOGA nor the SANTA CRUZ II attempted to establish VHF communications, and both sounded whistle signals that were contrary to the Inland Rules governing the encounter. Also, in both cases, the Safety Board said that a higher level of VTS could have alerted the vessels involved and would have provided better data for avoidance maneuvers. The FROSTA pilot tried unsuccessfully to establish VHF communications with the GEORGE PRINCE which failed to respond to either VHF or whistle signals.

Steering Failure

The Safety Board documented the need for improved steering reliability in five collision accidents within the study period. Steering failure accidents investigated by the Safety Board resulted in the issuance of 21 recommendations aimed at improving steering reliability. In a 1979 safety report (24) the Safety Board outlined the status of implementation of all steering safety measures recommended by the Safety Board and underscored the outstanding steering reliability problems that had not been addressed within the recommendation and followup process. The issues discussed in that report were: (1) the lack of sufficient redundancy and means to isolate defective components in the design of vital steering components or control parts, (2) inadequate maintenance and inspection requirements, and (3) the lack of established procedures for restoring steering control in an emergency.

The Safety Board's recent investigation of the collision of the Spanish freighter M/V POLA DE LENA with moored ferries on February 3, 1979, at New Orleans, Louisiana, demonstrated the consequences of inadequate maintenance and inspection of vital steering system components, as well as the lack of written procedures to be followed in the event of a steering failure. (25) Analysis of the steering system test results revealed that the electrical controls of the POLA DE LENA's steering system had malfunctioned, yet the hydraulic components were determined to have been functioning properly at the time of the accident.

The collision also demonstrated that redundancy of design can be of limited value unless the ship's bridge personnel are trained in the operation of the alternate steering system. The POLA DE LENA's crew had no written instructions to be followed and did not make optimum use of the available steering control redundancy. Although the electrical failure temporarily interrupted the ship's steering power, steering control could have been regained by immediately energizing a standby steering pump. However, the lack of written instructions resulted in uncertainty and costly delay.

The Safety Board also has found serious deficiencies in manning requirements as related to ship steering gear hardware reliability. The Peruvian freighter M/V INCA TUPAC YUPANQUI collided with a moored towboat and a butane barge in 1979 at Good Hope, Louisiana, and focused national attention on the adequacy of international requirements for steering gear. (13) Built in 1968, this vessel's steering system met all international and classification society requirements in effect at the time of construction. The Safety Board determined that an electrical control circuit had suffered either an open fuse or a damaged rectifier which resulted in complete loss of steering control from the

INCA TUPAC YUPANQUI's bridge. Despite this loss, the steering engineroom equipment remained operational and was capable of controlling the rudder. If a steering engineroom watch had been posted, local rudder control could have been engaged and could have prevented the accident. This investigation reinforced the Safety Board's support for requiring separate and independent vital steering system components and control paths, or alternatively, requiring the posting of a steering engineroom watch when separation and duplication of components and control paths are not provided.

DATA LIMITATIONS

Before examining the existing collision data, it was necessary to resolve the general difficulty of identifying and obtaining satisfactory collision data sources. The inadequacy of data for this type of study has been a recognized problem to the extent that other marine collision studies have mentioned the limited nature of available ship collision data. One study involving the establishment of collision prediction models in the U.S. (26) summarized the Coast Guard collision data shortcomings in terms of: (1) the "incongruous reporting periods for accident data and transit data," and (2) "the unspecified accident location for certain periods." A study of collisions at sea based on available collision data (27) concluded that the amount of casualty information collected in a collision investigation varies widely with different authorities and that the severity of the data problem depends on the flag state of the vessel. Although data shortcomings are not uncommon, the development of collision prevention measures within the present study could have been greatly facilitated by the existence of complete, readily available marine accident data such as port traffic density, the accident population at U.S. ports, number of steering failure accidents in a specific vessel category, and the leading major causes of ship collisions.

The problems of the lack of shipboard data for accident investigation purposes were discussed in the Safety Board investigations of the collision of the SS AFRICAN NEPTUNE with the Sidney Lanier Bridge in Brunswick, Georgia, on November 7, 1972, (28) and again following the collision of the SEA WITCH and the ESSO BRUSSELS in the New York Harbor, on June 2, 1973 (12). In each case, the Safety Board recommended adoption of a requirement for shipboard data recording devices such as the flight data recorder ("black box") used in aviation. The need to require the installation of ship data recorders was reiterated in the Safety Board's report of the SS MARINE FLORIDIAN collision with the Benjamin Harrison Memorial Bridge at Hopewell, Virginia, on February 27, 1977, (10) and again in the collision of the USCG Cutter BLACKTHORN with the SS CAPRICORN in Tampa Bay on January 28, 1980. (23) In response to the Safety Board's two recommendations to require ship data recorders, the Coast Guard has initiated a study to determine the population of applicable vessels and the degree of technical sophistication needed in data recorders. The Safety Board continues to believe that automatic data recorders in specific ship types could be a desirable feature for ship owners for efficient recording of position data while vastly improving the investigation into the cause of ship collisions, and that the Coast Guard study should be expedited.

CONSIDERATION OF ADDITIONAL COLLISION PREVENTION METHODS

Effective Use Of Radar

Vessels of 1,600 gross tons or more are required by regulation to be equipped with marine radar which is capable of providing surface navigation information, but ARPA are only required to be installed in certain vessels 10,000 gross tons or more. Regardless of the capability of the radar equipment, there exists a need for more effective use of radar in conjunction with communications equipment to reduce the number of collisions. The Safety Board believes that an effective training and retraining program for watch

officers, masters, and pilots is needed to reduce collisions involving vessels that have radar systems.

Simulator Research

Maritime organizations are beginning to provide marine shiphandling simulator training and have made significant progress in identifying and improving the watch officer's skills needed for the safe and effective handling of ships. Simulators can be used for training or retraining vessel operators in shiphandling or in the more effective use of radar or ARPA in restricted visibility. Among U.S. simulator research facilities is the Computer Aided Operations Research Facility (CAORF) at the National Maritime Research Center in King's Point, New York, which is operated by the U.S. Maritime Administration. The CAORF facility can simulate any world port under various visibility and traffic conditions, and simulates malfunctions such as the loss of steering or propulsion for training purposes although it is primarily a research facility. Other simulator facilities are being constructed or are operating at various locations in the U.S. and abroad.

The use of shiphandling simulators in the deck officer training and licensing programs is being studied by the U.S. Maritime Administration and the U.S. Coast Guard (29) and has the potential of improving training and licensing practices. Simulators have the advantage of representing different ports and different environmental and ship conditions, plus the fact that more training can be accomplished in a shorter time than at sea. However, another important factor is the capability to simulate general emergency shiphandling conditions without incurring the risk or cost that would be involved in similar at-sea training. The Safety Board believes that the use of shiphandling simulators should be further studied in conjunction with at-sea experience to determine their potential to identify the general emergency shiphandling procedures to be followed when ships experience vital control system failures.

Reducing the Effects of Restricted Maneuvering Room

According to a recent study concerning collisions in restricted waters, simulator training can fulfill only part of the overall need for the indoctrination of navigators. The author concluded that "ship accidents occur within a system made up of 3 elements: the navigator, the vessel, and the waterway." (30) This study has discussed previously the role of the navigator as well as the contribution of system failure to the cause of collisions. However, the role of restricted waterways also must be considered.

In the last 10 years, vessel traffic has experienced a major redistribution in ports such as Houston, Tampa Bay, New Orleans, and Puget Sound. (2) In these ports, waterborne commerce has increased sharply and has doubled in some cases. For example, the annual number of commercial vessel trips in the Port of New Orleans increased from 165,000 in 1969 to 321,000 in 1978. The increase has involved larger, less maneuverable vessels transiting certain waterways which were designed for traffic conditions existing several decades ago. These waterways may be not only shallow but restricted in width by banks, anchorages, fishing zones, and other zones and structures. The evolution of greater use of the restricted waters has resulted in the progressive restriction of "maneuvering room" because of a greater number of vessel encounters and the reduced latitude for maneuvering decisions. This in turn reduces the navigator's margin for error. In a study that investigated the hydrodynamic aspects of shallow water collisions, (31) the author stated that "the two-dimensional nature of the flow of water around a hull operating in shallow water not only changes the maneuvering behavior, but increases the interaction with other ships." This interaction with a passing ship was determined to be the cause of the ANCO SCEPTRE collision with a loading dock in the Houston Ship Channel on February 9, 1979. (32)

The U.S. Army Corps of Engineers has recently begun incorporating some solutions to the restricted waterway problems into its design of future deep-draft navigation projects. Included in the design is the consideration of such factors as the size, speed, and maneuverability of the larger vessels and tows. Other considerations are the degree of traffic congestion in relation to channel alignment, depth, and width, as well as aids to navigation and economic impact. This effort is commendable and holds the promise of improving waterway safety.

CONCLUSIONS

1. The implementation of Coast Guard regulations in 1984 in consonance with the latest IMCO revisions to the 1974 SOLAS Convention will resolve the majority of the Safety Board's current recommendations to improve steering reliability.

2. A need exists for specialized marine collision investigation data that more clearly identifies the human factor in the cause of ship collisions.

3. There is a need to identify, in connection with licensing and certification programs, the general emergency shiphandling procedures expected to be followed that will reduce ship collisions caused by vital control system failure.

4. There is a need to expedite the feasibility study of installing ship data recorders, with a view toward integrating the existing ship data systems into a standard array for developing measures to prevent similar accidents.

5. Shiphandling simulators should be used in conjunction with at-sea experience to help identify the general shiphandling procedures to be followed when ships experience vital control system failures.

6. The predominant causes of U.S. ship collisions, based on the frequency of occurrence as indicated by Coast Guard data, are: human error, equipment failure, collisions resulting from floating objects, and adverse weather.

7. The two leading causes of major ship collisions, based on the Safety Board's investigation data, are improper navigation (due to human error) and equipment failure.

RECOMMENDATIONS

As a result of this study, the National Transportation Safety Board made the following recommendations:

--to the U.S. Coast Guard:

> Expedite the study of the feasibility of requiring the installation of automatic recording devices aboard applicable ships to preserve vital navigational information. (Class II, Priority Action) (M-81-84)
>
> In cooperation with the U.S. Maritime Administration, identify and incorporate into licensing and certification programs the general emergency shiphandling procedures expected to be followed by vessel operators when ships experience vital control system failures. (Class II, Priority Action) (M-81-85)

--to the U.S. Maritime Administration:

In cooperation with the U.S. Coast Guard, develop a model simulator training program to reduce ship collisions caused by vital control system failure, which could be incorporated into licensing and certification programs. (Class II, Priority Action) (M-81-86)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD:

/s/ JAMES B. KING
Chairman

/s/ PATRICIA A. GOLDMAN
Member

/s/ G. H. PATRICK BURSLEY
Member

ELWOOD T. DRIVER, Vice Chairman, and FRANCIS H. McADAMS, Member, did not participate.

September 9, 1981

BLANK PAGE

LITERATURE CITED

1. U.S. Coast Guard, "Statistics of Casualties," Washington, D.C., 1979.

2. U.S. Army Corps of Engineers, "Waterborne Commerce of the United States," Fort Belvoir, Virginia, 1978.

3. Office of Technology Assessment, Congress of the United States, "An Analysis of Oil Tanker Casualties," Washington, D.C., February 1978.

4. National Transportation Safety Board, "Study of Collisions of Radar-Equipped Merchant Vessels and Preventive Recommendations," Washington, D.C., August 29, 1968.

5. National Transportation Safety Board, "Collisions Within the Navigable Waters of the U.S.: Consideration of Alternative Preventive Measures," Washington, D.C., 1972 (NTSB-MSS-72-1).

6. National Research Council, "Human Error in Merchant Marine Safety," Washington, D.C., 1976.

7. U.S. Coast Guard Study Report, "Collisions, Rammings, and Groundings," Washington, D.C., 1976.

8. National Transportation Safety Board Report, "Collision involving the SS AFRICAN STAR and M/V MIDWEST CITIES and Tow, Resulting in Fire and Loss of Life, in the Mississippi River on March 16, 1968," report released November 10, 1970.

9. Maxham, J.C., "Steering Gear Requirements - Changes on the International and Domestic Scene," Chesapeake Section Paper, Society of Naval Architects and Marine Engineers, May 21, 1981.

10. National Transportation Safety Board Report, "U.S. Tankship SS MARINE FLORIDIAN Collision with Benjamin Harrison Memorial Bridge, Hopewell, Virginia, February 24, 1977" (NTSB-MAR-78-1).

11. National Transportation Safety Board Report, "French Tankship SS SITALA Collision with Moored Vessels, New Orleans, Louisiana, July 28, 1977" (NTSB-MAR-78-10).

12. National Transportation Safety Board Report, "SS C.V. SEA WITCH - SS ESSO BRUSSELS Collision and Fire, New York Harbor, June 2, 1973" (USCG/NTSB-MAR-75-6).

13. National Transportation Safety Board Report, "Collision of Peruvian Freighter M/V INCA TUPAC YUPANQUI and U.S. Butane Barge PANAMA CITY, Mississippi River, Good Hope, Louisiana, August 30, 1979" (NTSB-MAR-80-7).

14. National Transportation Safety Board Report, "Collision of U.S. Tankship SS EXXON CHESTER and Liberian Freighter M/V REGAL SWORD in the Atlantic Ocean near Cape Cod, Massachusetts, June 18, 1979" (NTSB-MAR-80-11).

15. National Transportation Safety Board Report, "SS EDGAR M. QUEENY Collision with the Liberian S/T CORINTHOS, Marcus Hook, Pennsylvania, January 31, 1975" (NTSB-MAR-77-2).

16. Landsberg, A., et al., "Proposed Shipboard Maneuvering Data," Spring Meeting/Star Symposium, Society of Naval Architects and Marine Engineers, June 1980.

17. U.S. Coast Guard Study Report, "Vessel Traffic Systems - Analysis of Port Needs," Washington, D.C., August 1973.

18. Brolsma, Ir J. U., "Netherlands Maritime Institute Study of Collisions," Rotterdam Europort Delta, Rotterdam, The Netherlands, September 1977.

19. Butt, J. A., Discussion of Collision Avoidance Systems at Meeting of Royal Institute of Navigation, London, England, Tanker Bulker International, December 1977.

20. National Transportation Safety Board Report, "Collision of U.S. Bulk Carrier SS YELLOWSTONE and Algerian Freighter M/V IBN BATOUTA, Mediterranean Sea, June 12, 1978" (NTSB-MAR-79-11).

21. National Transportation Safety Board Report, "SS KEYTRADER - SS BAUNE Collision and Fire, with Loss of Life, Lower Mississippi River, January 18, 1974" (NTSB-MAR-77-1).

22. National Transportation Safety Board Report, "Collision of Argentine Freighter M/V SANTA CRUZ II and U.S. Coast Guard Cutter CUYAHOGA in Chesapeake Bay at the Mouth of the Potomac River, Maryland, October 20, 1978" (NTSB-MAR-79-3).

23. National Transportation Safety Board Report, "Collision of U.S. Coast Guard Cutter BLACKTHORN and U.S. Tankship CAPRICORN, Tampa Bay, Florida, January 28, 1980" (NTSB-MAR-80-14).

24. National Transportation Safety Board Report, "Progress Toward Improvements in Marine Steering Reliability," Washington, D.C., 1979 (NTSB-SR-79-1).

25. National Transportation Safety Board Report, "Collision of Spanish Freighter M/V POLA DE LENA with Two Mississippi River Ferry Boats and Gretna Ferry Landing, New Orleans, Louisiana, February 3, 1979" (NTSB-MAR-80-10).

26. Morgan, R. R., "A Methodology for Cost Effective Assessment of Alternatives to Reduce Ship Collisions," Doctoral Thesis, UCLA, 1979.

27. Cockroft A.N., "The Circumstances of Sea Collisions," Proceedings of the Fourth International Symposium on Vessel Traffic Services, Bremen, West Germany, 1981.

28. National Transportation Safety Board Report, "SS AFRICAN NEPTUNE Collision with Sidney Lanier Bridge, Brunswick, Georgia, November 7, 1972" (USCG/NTSB-MAR-74-4).

29. U.S. Coast Guard and U.S. Maritime Administration Study Report, "Simulators for Mariner Training and Licensing," Washington, D.C., July 1980.

30. Drager, K. H., et al, "Relationships of Collisions and Groundings - Research Project Conclusions." Proceedings of the Fourth International Symposium on Vessel Traffic Services, Bremen, West Germany, 1981.

31. Dand, I. W., "Hydrodynamic Aspects of Shallow Water Collisions" No. 6. Proceedings of the Royal Institute of Naval Architects, London, England, 1976.

32. National Transportation Safety Board Report, "M/V ANCO SCEPTRE Collision with the Crown Central Petroleum Corporation Pier, Houston Ship Channel, Houston, Texas, February 9, 1978" (NTSB-MAR-79-8).

33. National Transportation Safety Board Report, "SS FROSTA Collision with the Ferry GEORGE PRINCE, Mississippi River, October 20, 1976" (NTSB-MAR-79-4).

BLANK PAGE

APPENDIXES

APPENDIX A

LEGEND OF COLLISION SYNOPSIS SHOWN IN TABLE 3

COLLISION ENCOUNTER - The type of encounter—meeting, crossing, or overtaking situation--based on the classifications in the Rules of the Road.

PERSON DIRECTING MOVEMENT- Denotes whether the pilot, the master, a licensed watch officer, a master, or other person was directing the vessel's movement at the time of collision.

NAVIGATION CONDITION- Denotes whether those navigation aids indicated in the table were available and used to determine the ship's position and to arrange for the navigational encounter.

COMMUNICATION CONDITION- Denotes whether and by what method there was a transmission of navigational information, i.e. by VHF radiotelephone or by whistle signals.

(The navigation and communication conditions are denoted by: YES/NO for 1st vessel/2nd vessel, in the order named in the NTSB Report Number)

PREVAILING RULES - Identifies one of the four sets of traffic rules (Rules of the Road) that governed the navigation, i.e., Great Lakes Rules, Western Rivers Rules, Inland Rules, or International Rules of the Road.

SYSTEM FAILURE - Records the occasion where the failure of a vital control system or component was the first event that initiated the collision sequence.

APPENDIX B

SAFETY BOARD COLLISION PREVENTION RECOMMENDATIONS

PERSONNEL - LICENSING
RECOMMENDATION SUBJECTS
-- AS OF 7/07/81 --

RECOMMENDATION NUMBERS	LOG NUMBERS	SAFETY RECOMMENDATIONS
M-80-100	M-0138A	THE NTSB RECOMMENDS THAT THE AMERICAN WATERWAYS OPERATORS, INC.: NOTIFY MEMBER COMPANIES OF THE NEED FOR EACH COMPANY TO ESTABLISH PROCEDURES WHERE BY IT CAN INSURE THAT ONLY PROPERLY LICENSED PERSONNEL ARE EMPLOYED TO OPERATE TOWBOATS ON THE INLAND WATERWAYS AND WESTERN RIVERS OF THE UNITED STATES.

PERSONNEL - QUALIFICATIONS/TRAINING
RECOMMENDATION SUBJECTS
-- AS OF 7/07/81 --

RECOMMENDATION NUMBERS	LOG NUMBERS	SAFETY RECOMMENDATIONS
M-78-075	M-0083	REQUIRE THAT A PERSON APPLYING FOR AN OPERATOR'S LICENSE FOR VESSELS CARRYING MORE THAN SIX PASSENGERS FOR HIRE AND ENGAGED IN THE OFFSHORE OIL INDUSTRY BE EXAMINED IN THE USE OF ELECTRONIC NAVIGATIONAL EQUIPMENT SUCH AS RADAR, LORAN, AND FATHOMETERS.
M-78-076	M-0083	REQUIRE THAT THE OPERATOR OF EVERY RADAR-EQUIPPED VESSEL CARRYING NOT THAN SIX PASSENGERS FOR HIRE AND ENGAGED IN THE OFFSHORE OIL INDUSTRY BE QUALIFIED AS A "RADAR OBSERVER."
M-79-019	M-0088	REVIEW THE PERSONNEL ASSIGNMENT POLICY OF THE COAST GUARD TO INSURE THAT THE EXPERIENCE AND TRAINING LEVEL OF CRITICAL PERSONNEL IS HIGH, AND THAT THEIR TIME ON BOARD IS ADEQUATE FOR FAMILIARIZATION WITH THE VESSEL.
M-79-021	M-0088	ESTABLISH REQUIREMENTS TO INSURE THAT ALL TRAINING VESSELS HAVE ENOUGH INSTRUCTORS ABOARD SO THAT THE SAFE NAVIGATION OF THE VESSEL IS NOT ADVERSELY AFFECTED BY THE TRAINING PROGRAM.
M-79-022	M-0088	ESTABLISH A SERVICEWIDE POLICY TO PROVIDE GUIDANCE TO COMMANDING OFFICERS OF VESSELS CONCERNING THE NECESSARY QUALIFICATIONS FOR PERSONNEL WHO ARE ASSIGNED THE DUTIES OF OOD, LOOKOUT, HELMSMAN, QUARTERMASTER, AND OTHER IMPORTANT POSITIONS.
M-79-064	M-0084	DEVELOP WITH THE U.S. DEPARTMENT OF COMMERCE, MARITIME ADMINISTRATION, AND PILOTS' ASSOCIATIONS A PROGRAM TO INDOCTRINATE SHIPS' OFFICERS AND PILOTS ABOUT THE CAPABILITIES AND USE OF VTS TO IMPROVE SAFETY ON U.S. WATERWAYS.
M-79-065	M-0084	PUBLICIZE INFORMATION CONCERNING WATERWAY LOADING FACILITY DESIGN TO ELIMINATE OR MINIMIZE DAMAGE TO FACILITIES SUSCEPTIBLE TO DAMAGE FROM VESSEL COLLISION, AND INCORPORATE APPROPRIATE PRECAUTIONS IN REGULATIONS ABOUT THE DESIGN OF DESIGNATED WATERFRONT FACILITIES.
M-79-072	M-0094	THE NTSB RECOMMENDS THAT THE USCG: REQUIRE MORE FREQUENT EXAMINATIONS FOR RENEWAL OF A RADAR OBSERVER'S ENDORSEMENTS BY DECK OFFICERS OF THE U.S. MERCHANT MARINE TO MAINTAIN THEIR PROFICIENCY IN USING THE MANEUVERING BOARD FOR SOLVING RADAR TARGET PROBLEMS.
M-80-053	M-0134	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: EXPEDITE THE PROCESSING OF THE NOTICE OF PROPOSED RULEMAKING UNDER DOCKET CGD NO. 76-193A WHICH WOULD REQUIRE RADAR APPLICANTS FOR OBSERVER ENDORSEMENTS TO COMPLETE AN APPROVED RADAR TRAINING COURSE AT LEAST ONCE EVERY 5 YEARS.
M-80-055	M-0137	THE NTSB RECOMMENDS THAT THE EXXON TRANSPORTATION COMPANY: REQUIRE THAT MASTERS ASSIGNED TO A VESSEL EQUIPPED WITH AN AUTOMATED RADAR PLOTTING AID (ARPA) SUCCESSFULLY COMPLETE FORMAL TRAINING IN ITS USE BEFORE ASSIGNMENT.
M-80-064	M-0127	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: REQUIRE ALL COAST GUARD CANDIDATES FOR COMMAND OR DESIGNATION AS QUALIFIED DECK WATCH OFFICER ON COAST GUARD CUTTERS OVER 100 FT IN LENGTH TO PASS AN EXAMINATION SIMILAR TO THAT REQUIRED FOR CORRESPONDING MERCHANT MARINE LICENSES AND TO BE REEXAMINED ON A PERIODIC BASIS.
M-80-065	M-0127	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: REQUIRE ALL COAST GUARD CANDIDATES FOR COMMAND OR DESIGNATION AS QUALIFIED DECK WATCH OFFICER ON COAST GUARD CUTTERS OVER 100 FT IN LENGTH TO TAKE A COURSE IN BASIC SHIP STABILITY.
M-80-066	M-0127	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: REQUIRE ALL COAST GUARD CANDIDATES FOR DESIGNATION AS ENGINEERING OFFICER ON COAST GUARD CUTTERS OVER 100 FT IN LENGTH TO TAKE A COURSE IN BASIC SHIP STABILITY AND DEMONSTRATE THEIR KNOWLEDGE OF THE STABILITY AND LOADING DATA FOR THE CUTTER TO WHICH ASSIGNED.
M-80-067	M-0127	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: REQUIRE ALL COAST GUARD PERSONNEL DESIGNATED AS COMMANDING OFFICER OF CUTTERS OVER 100 FT IN LENGTH TO HAVE A PERIOD OF UNDERWAY TRAINING BEFORE ASSUMING COMMAND IF THEY HAVE BEEN ASHORE FOR AN EXTENDED PERIOD.
M-80-070	M-0127	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: REVIEW CURRENT WATER SURVIVAL TRAINING PROGRAMS FOR COAST GUARD PERSONNEL ASSIGNED TO CUTTERS, AND, INCREASE THE EFFECTIVENESS OF THESE PROGRAMS.

PERSONNEL - PHYSICAL FITNESS
RECOMMENDATION SUBJECTS
-- AS OF 7/07/81 --

RECOMMENDATION NUMBERS	LOG NUMBERS	SAFETY RECOMMENDATIONS
M-71-014	M-0021	INITIATE ACTION TO OBTAIN POST-MORTEM EXAMINATIONS, WHEN LEGALLY POSSIBLE, IN ITS INVESTIGATION OF THOSE CASES IN WHICH IT IS POSSIBLE THAT THE PHYSICAL CONDITION, POSSIBLE DEATH BEFORE THE CASUALTY, OR POSSIBLE PHYSICAL DEFECT OF PERSONS, COULD HAVE BEEN INVOLVED IN THE CASUALTY.
M-74-082	M-0035	DETERMINE THE EFFECTS OF FATIGUE ON PERSONNEL ERROR AS A CAUSE OF MARINE CASUALTIES, WITH PARTICULAR REFERENCE TO THE SIZES OF CREWS CARRIED ON TOWING VESSELS.

BEST DOCUMENT AVAILABLE

H-79-025	H-0088	ESTABLISH STANDARDS FOR THE TAKING OF MEDICATION BY WATCHSTANDERS ON COAST GUARD VESSELS TO INSURE THAT THE MEDICATION DOES NOT IMPEDE THE INDIVIDUALS ABILITY TO PERFORM HIS DUTIES.
H-79-026	H-0089	REQUIRE THAT WATCHSTANDERS WHO HAVE VISUAL IMPAIRMENT WEAR THEIR CORRECTIVE LENSES WHILE ON DUTY ABOARD COAST GUARD VESSELS.
H-79-108	H-0107	THE NTSB RECOMMENDS THAT THE BOARD OF RIVER PORT PILOT COMMISSIONERS FOR THE PORT OF NEW ORLEANS COOPERATE WITH THE CRESCENT RIVER PORT PILOTS ASSOCIATION TO: ESTABLISH GUIDELINES FOR PILOT DUTY PERIODS WHICH PROVIDE FOR SUFFICIENT REST TO AVOID FATIGUE.
H-79-109	H-0107	THE NTSB RECOMMENDS THAT THE BOARD OF RIVER PORT PILOT COMMISSIONERS FOR THE PORT OF NEW ORLEANS COOPERATE WITH THE CRESCENT RIVER PORT PILOTS ASSOCIATION TO: DEVELOP PHYSICAL STANDARDS FOR PILOTS TO PROVIDE REASONABLE ASSURANCE THAT THEY ARE QUALIFIED FOR DUTY AS PILOTS.
H-80-040	H-0126	THE NTSB RECOMMENDS THAT THE SABINE PILOTS: REVIEW PILOT ROTATION POLICIES RELATIVE TO VESSEL MOVEMENTS AND AVOID ASSIGNING PILOTS TO TWO CONSECUTIVE LONG TRIPS WITHOUT ADEQUATE REST BETWEEN SUCH ASSIGNMENTS.

PERSONNEL - MASTER-PILOT RELATIONSHIP
RECOMMENDATION SUBJECTS
-- AS OF 7/07/81 --

RECOMMENDATION NUMBERS	LOG NUMBERS	SAFETY RECOMMENDATIONS
H-74-013	H-0037	THE COAST GUARD REQUIRE THAT EVERY MASTER OF AN OCEAN-GOING VESSEL INFORM HIMSELF OF THE PILOT'S PLAN TO MANEUVER HIS SHIP IN OR OUT OF A HARBOR AND THAT THE MASTER DETERMINE, WITH THE PILOT'S ASSISTANCE, THE CRITICAL ASPECTS OF THE MANEUVER, INCLUDING THE PILOT'S PLAN FOR EMERGENCIES. THE MASTER SHOULD THEN BE REQUIRED TO INSTRUCT HIS CREW TO INSURE THAT HIGH-RISK TASKS RECEIVE PRIORITY.
H-77-033	H-0038	AMEND 33 CFR 164.11(K) TO REQUIRE THAT MASTERS AND PILOTS DISCUSS BEFOREHAND AND AGREE TO THE ESSENTIAL FEATURES AND RELEVANT CHECKPOINTS OF MANEUVERS EXPECTED TO BE UNDERTAKEN.
H-79-020	H-0088	REVIEW THE MANNING LEVEL OF COAST GUARD VESSELS, PARTICULARLY TRAINING VESSELS, TO INSURE THAT AN ADEQUATE NUMBER OF EXPERIENCED PERSONS ARE ASSIGNED TO STAND WATCHES, AND THAT TRAINEES ARE NOT REQUIRED TO STAND CRITICAL WATCHES.
H-79-107	H-0107	THE NTSB RECOMMENDS THAT THE BOARD OF RIVER PORT PILOT COMMISSIONERS FOR THE PORT OF NEW ORLEANS COOPERATE WITH THE CRESCENT RIVER PORT PILOTS ASSOCIATION TO: INCLUDE IN THE PRESCRIBED PROCEDURES FOR PILOTS UNDER THEIR JURISDICTION A REQUIREMENT THAT PILOTS SPECIFICALLY ASCERTAIN VESSEL MANEUVERING CHARACTERISTICS BEFORE GETTING UNDERWAY, AND THAT THEY DISCUSS WITH THE MASTER BEFORE GETTING UNDERWAY THE ESSENTIAL FEATURES AND RELEVANT CHECKPOINTS FOR MANEUVERS TO BE UNDERTAKEN.
H-79-115	H-0098	THE NTSB RECOMMENDS THAT THE GALVESTON-TEXAS CITY PILOTS ASSOCIATION, THE HOUSTON PILOTS ASSOCIATION AND THE AMERICAN PILOTS ASSOCIATION: REQUIRE MEMBER PILOTS TO CONFER WITH SHIPS' MASTERS ON ANY MANEUVERING AGREEMENTS MADE OVER THE RADIOTELEPHONE WELL IN ADVANCE OF THE EXECUTION.
H-80-007	H-0113	THE NTSB RECOMMENDS THAT THE ASSOCIATED BRANCH PILOTS AND THE CRESCENT RIVER PORT PILOTS ASSOCIATION: REQUEST MEMBER PILOTS TO INFORM VESSEL MASTERS CONCERNING THE REQUIREMENTS OF 33 CFR 164, NAVIGATION SAFETY REGULATIONS, AND ADVISE MEMBER PILOTS TO USE THE NAVIGATION BRIDGE WATCH TO KEEP THEMSELVES ADVISED OF THE VESSEL'S POSITION AND SPEED.
H-80-015	H-0110	THE NTSB RECOMMENDS THAT THE CRESCENT RIVER PORT PILOTS ASSOCIATION: PROMULGATE A POLICY THAT MEMBER PILOTS CONFER WITH SHIPS' MASTERS ON ANY HIGH RISK MANEUVERING AGREEMENTS MADE OVER THE BRIDGE-TO-BRIDGE RADIOTELEPHONE, WELL IN ADVANCE OF THE EXECUTION.

PERSONNEL - MANNING
RECOMMENDATION SUBJECTS
-- AS OF 7/07/81 --

RECOMMENDATION NUMBERS	LOG NUMBERS	SAFETY RECOMMENDATIONS
H-79-056	H-0095	DEVELOP NAVIGATION WATCHKEEPING STANDARDS WHICH QUANTIFY THE MINIMUM MANNING LEVEL NEEDED FOR LARGE OCEANGOING VESSELS TO SAFELY NAVIGATE WITHIN U.S. PORTS AND THEIR APPROACHES AND AMEND THE NAVIGATION SAFETY REGULATIONS (33 CFR 164) TO INCORPORATE THESE STANDARDS.
H-79-093	H-0102	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: MAKE A SPECIAL EVALUATION, IN COORDINATION WITH THE MILITARY SEALIFT COMMAND, TO DETERMINE ANY DEFICIENCIES INVOLVED IN MAINTAINING THE AUTOMATED CONTROL SYSTEMS OF ALL MINE VESSELS OF THE CLASS, AS MEASURED BY THE CRITERIA STATED IN NVIC NO. 1-69, AND MAKE THE CHANGES IN MANNING AND EQUIPMENT REQUIREMENTS NEEDED TO ACHIEVE AN ACCEPTABLE DEGREE OF MAINTAINABILITY.
H-79-094	H-0102	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: REVISE AND REISSUE NVIC NO. 1-69 TO PROVIDE GUIDANCE FOR STANDARDS IN CONFORMANCE WITH THOSE PRESCRIBED BY 46 CFR 113 AS REVISED PURSUANT TO THE FIRST FOUR PRECEDING RECOMMENDATIONS, AND TO REFLECT MAINTAINABILITY CRITERIA RELATED TO THE ADEQUACY OF MANNING, EQUIPMENT DESIGN, INSTRUCTION MANUALS, SPARE PARTS, AND SHORESIDE SUPPORT FOR AUTOMATED CONTROL SYSTEMS AND OTHER FACTORS, AS DETERMINED TO BE NEEDED BY THE RECOMMENDED SPECIAL EVALUATION.
H-79-100	H-0100	THE NTSB RECOMMENDS THAT THE GEOLOGICAL SURVEY, U.S. DEPARTMENT OF THE INTERIOR: ARRANGE WITH THE U.S. COAST GUARD FOR AN EXAMINATION OF THE R/V DON J. MILLER II TO DETERMINE THE EXTENT TO WHICH SHE CONFORMS TO THE MINIMUM MANNING AND OTHER REGULATIONS APPLICABLE TO PRIVATELY OPERATED VESSELS OF THE SAME TYPE AND SIZE ENGAGED IN SIMILAR OCEANOGRAPHIC OPERATIONS WITH EMBARKED SCIENTISTS, AND IF NECESSARY, CONSIDER TAKING ACTION TO BRING THE VESSEL INTO REASONABLE CONFORMANCE WITH THE STANDARDS PRESCRIBED BY REGULATIONS FOR PRIVATELY OPERATED RESEARCH VESSELS.

VESSEL OPERATIONS - OPERATING PROCEDURES
RECOMMENDATION SUBJECTS
-- AS OF 7/07/81 --

RECOMMENDATION NUMBERS	LOG NUMBERS	SAFETY RECOMMENDATIONS
H-79-006	H-0015	THE COAST GUARD CONSIDER REGULATIONS REQUIRING THAT HAZARDOUS CARGO MANIFESTS BE LOCATED IN SPECIFIED AND ACCESSIBLE LOCATIONS ON ALL CARGO VESSELS.

BEST DOCUMENT AVAILABLE

M-74-003	M-0035	PUBLISH AND MAKE AVAILABLE TO TOWBOAT OPERATORS GUIDELINES FOR SAFE OPERATING PROCEDURES FOR TOWING OPERATIONS. THESE GUIDELINES SHOULD INCLUDE METHODS OF PREPLANNING A VOYAGE, THE PROPER USE OF TOWING HAWSERS, AND ACTIONS TO BE TAKEN IN VARIOUS EMERGENCY SITUATIONS.
M-74-019	M-0037	THE COAST GUARD, IN PROCESSING APPLICATIONS FOR HIGHWAY, RAILROAD, OR PIPELINE BRIDGE CONSTRUCTION, REQUIRE A SAFETY IMPACT STUDY AS WELL AS THE ENVIRONMENTAL IMPACT STUDY. LIFT SPAN BRIDGES WITH NARROW OPENINGS, SUPPORTS IN RELATIVELY DEEP WATER, AND LOCATIONS NEAR CURVED CHANNELS SHOULD BE CONSIDERED RELATIVELY HAZARDOUS.
M-78-077	M-0083	REQUIRE THAT THE OPERATORS OF VESSELS CARRYING MORE THAN SIX PASSENGERS FOR HIRE AND ENGAGED IN THE OFFSHORE OIL INDUSTRY, WHEN OPERATING FOR MORE THAN 12 HOURS: (1) ESTABLISH STANDARDIZED WATCH SCHEDULES TO MINIMIZE FATIGUE FROM PROLONGED DUTY HOURS; (2) APPOINT ONE OPERATOR TO BE IN CHARGE TO ESTABLISH RESPONSIBILITY OF COMMAND AND TO AVOID CONFUSION IN AN EMERGENCY.
M-79-032	M-0080	REQUIRE PASSENGER-FERRY OPERATORS TO ISSUE WRITTEN INSTRUCTIONS TO MASTERS AND CREWS CONCERNING PASSENGER SAFETY IN THE EVENT OF A COLLISION.
M-79-034	M-0080	REQUIRE PILOTS TO RING 'STAND-BY' ON MAIN ENGINES OR OTHERWISE ALERT THE ENGINEROOM WHEN APPROACHING CROSS-TRAFFIC LANES WHERE EMERGENCY ENGINE MANEUVERS MAY BE REQUIRED ON U.S. NAVIGABLE WATERWAYS.
M-79-057	M-0095	STUDY THE FEASIBILITY OF RELOCATING THE CHESAPEAKE BAY PILOTAGE AREA SO THAT VESSELS ARE NOT FORCED TO TRANSIT AREAS OF CONVERGING TRAFFIC WITHOUT PILOTS ON BOARD.
M-79-076	M-0101	THE NTSB RECOMMENDS THAT THE USCG: RECORD VHF RADIO-TELEPHONE TRANSMISSIONS ON ALL CHANNELS USED FOR TRANSMITTING NAVIGATIONAL INFORMATION IN THE VICINITY OF THE ENTRANCE OF THE CHESAPEAKE BAY AND KEEP RECORDINGS CONCERNING MARINE CASUALTIES FOR AT LEAST 1 YEAR.
M-79-096	M-0102	THE NSTB RECOMMENDS THAT THE U.S. COAST GUARD: AMEND 33 CFR 164.53(B) TO ADD AUTOMATED CONTROL SYSTEMS AND SHAFT RPM AND THRUST DIRECTION INDICATORS TO THOSE EQUIPMENTS SPECIFICALLY REQUIRED TO BE REPORTED TO THE COAST GUARD WHEN THEY ARE NOT OPERATING PROPERLY.
M-79-097	M-0102	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: AMEND 33 CFR 124.14 TO ENUMERATE SPECIFIC CONDITIONS OR INOPERATIVE EQUIPMENT, INCLUDING AUTOMATED CONTROL SYSTEMS AND SHAFT RPM AND THRUST DIRECTION INDICATORS, THAT ARE DEEMED TO CONSTITUTE ABNORMAL CONDITIONS REQUIRED TO BE REPORTED TO THE COAST GUARD.
M-79-113	M-0097	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: REQUIRE HELMSMEN IN THE U.S. MERCHANT MARINE TO INFORM THE OFFICER IN CHARGE OF NAVIGATION OF THE VESSEL WHEN RUDDER ORDERS HAVE BEEN EXECUTED, IN ADDITION TO THE PRESENT PRACTICE OF REPEATING THEM AS THEY ARE GIVEN.
M-79-114	M-0098	THE NTSB RECOMMENDS THAT THE GALVESTON-TEXAS CITY PILOTS ASSOCIATION AND THE HOUSTON PILOTS ASSOCIATION: REQUIRE MEMBER PILOTS PILOTING DEEP-DRAFT VESSELS TO REFRAIN FROM OVERTAKING OR MEETING OTHER VESSELS AT THE BENDS IN THE GALVESTON-HOUSTON SHIP CHANNEL.
M-80-014	M-0119	THE NTSB RECOMMENDS THAT THE CRESCENT RIVER PORT PILOTS ASSOCIATION: PROMULGATE A POLICY THAT MEMBER PILOTS REFRAIN FROM MEETING OR OVERTAKING OTHER VESSELS AT BENDS IN THE LOWER MISSISSIPPI RIVER WHICH PRESENT DIFFICULT NAVIGATIONAL PROBLEMS DURING CONDITIONS OF REDUCED VISIBILITY.
M-80-031	M-0119	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: AMEND 33 CFR 164.15(C) TO REQUIRE THAT THE SHIP'S PERSONNEL ASSIGNED TO DROP THE ANCHOR IN AN EMERGENCY BE STATIONED AT THE ANCHOR WINDLASS CONTROLS.
M-80-033	M-0119	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: STUDY THE USE OF WATERFRONT FACILITIES, LOCATED IN BENDS ON THE MISSISSIPPI RIVER, FOR THE TRANSFER OF CARGOES OF PARTICULAR HAZARD LISTED IN 33 CFR 124.14, AND IF NECESSARY PROMULGATE APPROPRIATE REGULATIONS TO PROHIBIT SITING FUTURE FACILITIES IN BENDS.
M-80-034	M-0119	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: REQUIRE VESSELS, LOADING OR UNLOADING CARGOES OF PARTICULAR HAZARD AS LISTED IN 33 CFR 124.14, TO CONDUCT OPERATIONS ON THE SHORE SIDE OF THE FACILITY, WHEREVER POSSIBLE ON THE MISSISSIPPI RIVER.
M-80-035	M-0119	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: INCREASE THE MONITORING OF VESSELS ENGAGED IN THE CARRIAGE OF TRANSFER OF LIQUEFIED GASES IN OR NEAR THE PORT OF NEW ORLEANS.
M-80-038	M-0126	THE NTSB RECOMMENDS THAT THE SABINE PILOTS: IMPLEMENT A POLICY THAT PILOTS AVOID VESSEL PASSING IN BENDS, AND INCORPORATE A SIMILAR PROVISION IN THE 'VOLUNTARY TRAFFIC CONTROL AGREEMENT OF THE MARITIME INDUSTRY OF THE SABINE WATERWAYS.'
M-80-039	M-0126	THE NTSB RECOMMENDS THAT THE SABINE PILOTS: ADVISE MEMBER PILOTS TO VERIFY THE LOCATIONS OF VESSELS MOVING ON THE SABINE-NECHES WATERWAYS BEFORE GETTING UNDERWAY, AND TO AVOID DEPARTURES OR VESSEL MOVEMENTS WHICH RESULT IN PASSING SITUATIONS THAT COULD BE ELIMINATED.
M-80-041	M-0126	THE NTSB RECOMMENDS THAT THE SABINE PILOTS: ADVISE MEMBER PILOTS TO REVIEW THE NAVIGATION SAFETY REGULATIONS AT 33 CFR 164 AND URGE PILOTS TO MAKE GREATER USE OF A VESSEL'S BRIDGEWATCH AND ELECTRONIC EQUIPMENT IN SUPPORT OF ITS NAVIGATIONAL CONTROL WHILE PILOTING.
M-80-071	M-0127	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: REQUIRE THAT COMMANDING OFFICERS OF COAST GUARD CUTTERS OVER 100 FT IN LENGTH EMPLOY PILOTS WHEN THE COMMANDING OFFICER IS UNFAMILIAR WITH PILOTAGE WATERS.

VESSEL OPERATIONS - MANEUVERING
RECOMMENDATION SUBJECTS
-- AS OF 7/07/81 --

RECOMMENDATION NUMBERS	LOG NUMBERS	SAFETY RECOMMENDATIONS
M-74-014	M-0037	THE COAST GUARD REQUIRE THAT OCEAN-GOING VESSELS BE ALIRED WITH ANY CHANNEL BRIDGE OPENING BEFORE THE VESSELS REACH A POINT EQUAL TO THE SHIP S STOPPING DISTANCE FROM THE BRIDGE.
M-74-016	M-0037	THE COAST GUARD EXPEDITE THE ISSUANCE OF REGULATIONS REQUIRING THAT ALL OCEAN-GOING VESSELS BE PROVIDED WITH STOPPING DISTANCES AND TURNING RADII FOR VARIOUS SPEEDS AND LOADING CONDITIONS.
M-78-082	M-0079	AMEND 33 CFR 164 TO REQUIRE THAT PILOTS REVIEW THE MANEUVERING CHARACTERISTICS OF THE VESSEL, AS DISCUSSED IN 33 CFR 164.11(K), BEFORE THEY COMMENCE NAVIGATION OF A VESSEL.
M-79-105	M-0104	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: INCLUDE IN ITS FOREIGN VESSEL BOARDING PROGRAM CHECKLIST A REQUIREMENT TO DETERMINE THAT MANEUVERING INFORMATION IS DISPLAYED AS REQUIRED BY 33 CFR 164.35(B).

BEST DOCUMENT AVAILABLE

WATERWAY
RECOMMENDATION SUBJECTS
— AS OF 7/07/81 —

RECOMMENDATION NUMBERS	LOG NUMBERS	SAFETY RECOMMENDATIONS
M-79-062	M-0084	INITIATE ACTION WITH NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION TO SURVEY CURRENTS IN THE HOUSTON SHIP CHANNEL AND MAKE PERTINENT INFORMATION AVAILABLE TO MARINERS USING THE CHANNEL.
M-79-063	M-0084	REQUEST THE U.S. ARMY CORPS OF ENGINEERS TO MAKE PERTINENT HOUSTON SHIP CHANNEL SILTING INFORMATION AVAILABLE TO MARINERS USING THE CHANNEL.
M-79-077	M-0101	THE NTSB RECOMMENDS THAT THE USCG: RELOCATE THE DEMARCATION LINE SEPARATING THE INLAND AND INTERNATIONAL RULES OF THE ROAD TO SOME POINT AWAY FROM THE PRECAUTIONARY AREA AT THE ENTRANCE OF THE CHESAPEAKE BAY.
M-79-078	M-0101	THE NTSB RECOMMENDS THAT THE USCG: ESTABLISH AN ADDITIONAL DESIGNATED PILOTAGE AREA AT SOME POINT EAST OF THE PRECAUTIONARY AREA AT THE ENTRANCE OF THE CHESAPEAKE BAY, WHERE PILOTS WOULD EMBARK AND DISEMBARK VESSELS DURING FAVORABLE WEATHER CONDITIONS.
M-80-018	M-0115	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: IN COOPERATION WITH THE U.S. ARMY CORPS OF ENGINEERS, ESTABLISH METHODS TO MEASURE AND TO MAKE AVAILABLE CONTINUALLY UPDATED INFORMATION ON RIVER STAGE AND CURRENT VELOCITY TO VESSELS TRANSITING THE BERWICK BAY BRIDGES.
M-80-020	M-0115	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: REASSESS THE CRITERIA USED TO COMMENCE HIGH WATER LIMITATIONS IN THE BERWICK BAY VESSEL TRAFFIC SERVICE AREA AND IMPLEMENT LIMITATIONS BASED ON THE REASSESSMENT.
M-80-022	M-0116	THE NTSB RECOMMENDS THAT THE U.S. ARMY CORPS OF ENGINEERS: IN COOPERATION WITH THE U.S. COAST GUARD, ESTABLISH METHODS TO MEASURE AND MAKE AVAILABLE CONTINUALLY UPDATED INFORMATION ON RIVER STAGE AND CURRENT VELOCITY TO VESSELS TRANSITING THE BERWICK BAY BRIDGES.
M-80-077	M-0127	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: IN CONJUNCTION WITH APPROPRIATE FEDERAL AND STATE AGENCIES, RELOCATE THE INTERSECTION OF THE INTERCOASTAL WATERWAY AND THE SOUTHWEST CHANNEL AND THE MAIN SHIPPING CHANNEL IN TAMPA BAY AWAY FROM BUOY 2A.

RULES OF THE ROAD - STEERING/SAILING RULES
RECOMMENDATION SUBJECTS
— AS OF 7/07/81 —

RECOMMENDATION NUMBERS	LOG NUMBERS	SAFETY RECOMMENDATIONS
M-79-003	M-0015	THE COAST GUARD, ARMY CORPS OF ENGINEERS, AND COAST AND GEODETIC SURVEY CONSIDER: INCLUDING IN THE COAST PILOT OR OTHER APPROPRIATE NAVIGATIONAL GUIDE, INFORMATION FOR THE INLAND WATERWAYS ON THE "POINTS AND BENDS" CUSTOM AND ITS EFFECT ON 33 U.S.C. 203 (RULE I) AND 33 U.S.C. 210 (ARTICLE 25), THE NARROW CHANNEL RULE, AND OTHER NAVIGATIONAL INFORMATION USEFUL IN NAVIGATING THESE WATERS; AND THE NEED FOR CLARIFICATION OF THESE RULES IN THE PROPOSED "UNITED STATES NAUTICAL RULES" (H.R. 214).
M-79-002	M-0031	THE COAST GUARD INCLUDE A CAUTIONARY NOTE IN THE "RULES OF THE ROAD: WESTERN RIVERS" STATING THAT EVEN WHEN BEARINGS OF AN APPROACHING VESSEL ARE CHANGING, THERE CAN BE A RISK OF COLLISION WITH A LONG TOW AHEAD OF THE TOWBOAT MAKING THE OBSERVATIONS.
M-79-005	M-0031	THE COAST GUARD CLARIFY THE EFFECT ON RESPONSIBILITIES FOR INITIATION OF WHISTLE SIGNALS IN "RULES OF THE ROAD," OF THE REQUIREMENT THAT EASILY MANEUVERABLE VESSELS LESS THAN 65 FEET SHALL NOT HAMPER LARGE VESSELS OR VESSELS WITH TOWS, AND DEVELOP AND PUBLISH AUTHORITATIVE INTERPRETATIONS OF ACTIONS REQUIRED IN OTHER FREQUENTLY ENCOUNTERED OPERATING SITUATIONS IN WHICH THE "SHALL NOT HAMPER" RULE INTERACTS WITH OTHER RULES.
M-79-001	M-0066	EXPEDITE THE SUBMISSION OF THE LEGISLATIVE PROPOSAL AND URGE CONGRESS TO ENACT LEGISLATION, OR AUTHORIZE THE COAST GUARD TO UNDERTAKE RULEMAKING, TO ESTABLISH IN THE NAVIGATION RULES FOR INLAND WATERS A REQUIREMENT FOR VESSELS TO PROCEED AT A SAFE SPEED IDENTICAL TO THE REQUIREMENT ESTABLISHED BY RULE 6 OF THE NEWLY ADOPTED INTERNATIONAL CONVENTION FOR VESSELS ON THE HIGH SEAS WHICH BECAME EFFECTIVE ON JULY 15, 1977.
M-79-027	M-0088	TAKE THE ACTION NECESSARY TO AMEND THE INLAND RULES AND THE PILOT RULES FOR INLAND WATERS TO PROVIDE MARINERS THE FLEXIBILITY TO INITIATE EARLY ACTION IN CROSSING SITUATIONS TO PREVENT DANGEROUSLY CLOSE SITUATIONS AS HAS BEEN DONE IN THE INTERNATIONAL RULES FOR PREVENTING COLLISIONS AT SEA, 1972.
M-79-031	M-0089	INSURE THAT MEMBERS OF YOUR ASSOCIATION COMPLY WITH SECTION 33 CFR 80.3(A) OF THE PILOT RULES FOR INLAND WATERS WHICH STATES: THE SIGNALS FOR PASSING, BY THE BLOWING OF THE WHISTLE, SHALL BE GIVEN AND ANSWERED BY PILOTS, IN COMPLIANCE WITH THE RULES IN THIS PART, NOT ONLY WHEN MEETING HEAD AND HEAD, OR NEARLY SO, BUT AT ALL TIMES WHEN THE STEAM VESSELS ARE IN SIGHT OF EACH OTHER, WHEN PASSING OR MEETING AT A DISTANCE WITHIN HALF A MILE OF EACH OTHER, AND WHETHER PASSING TO THE STARBOARD OR PORT.
M-79-035	M-0090	INCLUDE IN THE NEXT REVISION OF THE WESTERN RIVERS RULES OF THE ROAD: (A) A REQUIREMENT THAT CROSSING FERRIES KEEP CLEAR OF CHANNEL-BOUND TRAFFIC AND AVOID ANY MANEUVER TOWARD SUCH TRAFFIC WHICH MAY BE MISINTERPRETED; (B) REQUIREMENTS FOR IMMEDIATE RESPONSES, USING CONSISTENT LANGUAGE, IN ALL RULES INVOLVING THE EXCHANGE OF SIGNALS TO REACH MANEUVERING AGREEMENTS; (C) INTERPRETIVE RULINGS RELATIVE TO "PROPER LOOK-OUT," CLARIFYING LOOKOUT LOCATION, TIMES OF POSTING, AND ACCEPTABLE COMMUNICATIONS WITH THE CONNING OFFICER, AS APPLICABLE TO SELF-PROPELLED VESSELS AND TOWING VESSELS WHEN TOWING; (D) AN APPROPRIATE CAUTIONARY NOTE CONCERNING THE CLOSING OF PILOTHOUSE WINDOWS AND DOORS, AND THE EFFECT ON MAINTAINING A PROPER LOOK-OUT.
M-79-038	M-0089A	INSURE THAT MARYLAND PILOTS COMPLY WITH SECTION 33 CFR 80.3(A) OF THE PILOT RULES FOR INLAND WATERS WHICH STATES: THE SIGNALS FOR PASSING, BY THE BLOWING OF THE WHISTLE, SHALL BE GIVEN AND ANSWERED BY PILOTS, IN COMPLIANCE WITH THE RULES IN THIS PART, NOT ONLY WHEN MEETING HEAD AND HEAD, OR NEARLY SO, BUT AT ALL TIMES WHEN THE STEAM VESSELS ARE IN SIGHT OF EACH OTHER, WHEN PASSING OR MEETING AT A DISTANCE WITHIN HALF A MILE OF EACH OTHER, AND WHETHER PASSING TO THE STARBOARD OR PORT.
M-79-077	M-0101	THE NTSB RECOMMENDS THAT THE USCG: RELOCATE THE DEMARCATION LINE SEPARATING THE INLAND AND INTERNATIONAL RULES OF THE ROAD TO SOME POINT AWAY FROM THE PRECAUTIONARY AREA AT THE ENTRANCE OF THE CHESAPEAKE BAY.

BEST DOCUMENT AVAILABLE.

M-79-112	M-0097	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: ISSUE A REGULATION TO PROHIBIT DEEP-DRAFT VESSELS OVERTAKING OR MEETING EACH OTHER AT THE BENDS IN THE CHANNELS WHEN TRAVERSING THE GALVESTON-HOUSTON SHIP CHANNEL.
M-80-017	M-0110	THE NTSB RECOMMENDS THAT THE CRESCENT RIVER PORT PILOTS ASSOCIATION: INSTRUCT MEMBER PILOTS REGARDING THE IMPORTANCE OF COMPLYING WITH ARTICLE 15 OF THE INLAND RULES OF THE ROAD WHICH STATES, IN PART: 'IN FOG, MIST, FALLING SNOW, OR HEAVY RAINSTORMS, WHETHER BY DAY OR NIGHT, THE SIGNALS DESCRIBED IN THIS ARTICLE SHALL BE USED AS FOLLOWS, NAMELY: (A) A STEAM VESSEL UNDER WAY SHALL SOUND, AT INTERVALS OF NOT MORE THAN ONE MINUTE, A PROLONGED BLAST.'

RULES OF THE ROAD - VHF RADIOTELEPHONE
RECOMMENDATION SUBJECTS
-- AS OF 7/07/81 --

RECOMMENDATION NUMBERS	LOG NUMBERS	SAFETY RECOMMENDATIONS
M-70-007	M-0016	THE CONGRESS ENACT THE HOUSE-PASSED H.R. 6971, BRIDGE-TO-BRIDGE RADIOTELEPHONE BILL, AT THE EARLIEST DATE PRACTICABLE. OUR ANALYSIS OF THIS COLLISION, AS WELL AS OTHERS, INDICATES THE POTENTIAL FOR A CATASTROPHIC CASUALTY INVOLVING VESSELS CARRYING HAZARDOUS MATERIALS; AND THE NEED FOR ASSURANCE OF SUCH COMMUNICATIONS' CAPABILITY BETWEEN VESSELS TRANSPORTING THESE COMMODITIES.
M-70-008	M-0016	PENDING ENACTMENT OF SUCH LEGISLATION, THE AMERICAN PILOTS' ASSOCIATION URGE THEIR PILOTS TO REQUEST THE MASTER OF VESSELS WHICH THEY ARE PILOTING TO GUARD THE LOCAL TOWING VESSEL FREQUENCY, AND BROADCAST THEIR VESSELS' OPERATIONAL INTENTIONS ON THIS FREQUENCY, IN ADDITION TO THE BROADCAST BY THE LOCAL PILOTS ON THE LOCAL VHF FREQUENCY.
M-71-011	M-0021	CONSIDER, IN ITS CURRENT STUDY OF MARINE BOARDS OF INVESTIGATION, CHANGING THE PROCEDURES USED IN INVESTIGATIONS OF ITS OWN ACCIDENT-INVOLVED ACTIVITIES.
M-79-017	M-0088	INSTALL VHF RADIOTELEPHONES ON COAST GUARD CUTTERS WHICH WILL CONSTANTLY MONITOR CHANNEL 13.
M-79-018	M-0088	DETERMINE IN QUANTITATIVE TERMS AT WHAT MINIMUM DISTANCE NAVIGATIONAL INFORMATION SHOULD BE TRANSMITTED BY BRIDGE-TO-BRIDGE RADIOTELEPHONE IN PASSING, CROSSING, OR MEETING SITUATIONS, AND PROMULGATE REGULATIONS ACCORDINGLY.
M-79-074	M-0096	THE NTSB RECOMMENDS THAT THE USCG: ESTABLISH A TIMETABLE FOR EXPEDITING COAST GUARD ACTION TO PROMOTE THE ADOPTION BY THE INTERGOVERNMENTAL MARITIME CONSULTATIVE ORGANIZATION OF A REQUIREMENT OF THE USE OF BRIDGE-TO-BRIDGE RADIOTELEPHONE IN COLLISION AVOIDANCE.
M-79-106	M-0104	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: ESTABLISH, WITH THE ASSISTANCE OF THE FEDERAL COMMUNICATIONS COMMISSION, A MONITORING AND ENFORCEMENT PROGRAM AND A PUBLIC INFORMATION PROGRAM TO REDUCE IMPROPER USE OF THE BRIDGE-TO-BRIDGE RADIOTELEPHONE CHANNELS ON THE LOWER MISSISSIPPI RIVER.
M-80-006	M-0113	THE NTSB RECOMMENDS THAT THE ASSOCIATED BRANCH PILOTS AND THE CRESCENT RIVER PORT PILOTS ASSOCIATION: REVIEW THE PILOT EXCHANGE BOARDING AND RADIOTELEPHONE COMMUNICATIONS PRACTICES USED OFF PILOTTOWN AND ESTABLISH A POLICY BY WHICH (1) THE BAR AND RIVER PILOTS MAINTAIN UNINTERRUPTED COMMUNICATIONS DURING THE PILOT EXCHANGE, AND (2) THAT THEY COMMUNICATE VESSEL COURSE AND SPEED INFORMATION AND THEIR MANEUVERING INTENTIONS.
M-80-008	M-0113	THE NTSB RECOMMENDS THAT THE ASSOCIATED BRANCH PILOTS AND THE CRESCENT RIVER PORT PILOTS ASSOCIATION: ENCOURAGE MEMBER PILOTS TO MONITOR THEIR PORTABLE RADIOTELEPHONES WHILE DIRECTING VESSEL MOVEMENTS UNTIL THEY ARE PROPERLY RELIEVED OF THEIR RESPONSIBILITY.
M-80-037	M-0126	THE NTSB RECOMMENDS THAT THE SABINE PILOTS: REVIEW COMMUNICATIONS PROCEDURES TO INSURE THAT THE MOVEMENTS OF VESSELS ON THE SABINE-NECHES WATERWAYS ARE CLOSELY MONITORED AND COORDINATED.
M-80-054	M-0136	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: REQUEST THAT THE AGENDA FOR THE JANUARY 1981 SESSION OF THE INTERGOVERNMENTAL MARITIME CONSULTATIVE ORGANIZATION'S (IMCO) SUBCOMMITTEE OF SAFETY OF NAVIGATION BE MODIFIED AS NECESSARY TO INSURE TIMELY DISCUSSION OF AND ADOPTION OF AN INTERNATIONAL AGREEMENT REQUIRING USE OF BRIDGE-TO-BRIDGE RADIOTELEPHONE FOR NAVIGATION PURPOSES IN INTERNATIONAL WATERS.
M-80-072	M-0127	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: REQUIRE COMMANDING OFFICERS OF COAST GUARD CUTTERS OVER 100 FT IN LENGTH TO CONFORM TO LOCAL PRACTICE REGARDING EXCHANGE OF INFORMATION WITH LOCAL PILOT ASSOCIATIONS REGARDING THEIR MOVEMENTS IN PILOTAGE WATERS, UNLESS SUCH EXCHANGE WOULD BE IN THE INTEREST OF NATIONAL SECURITY.
M-80-073	M-0127	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: REQUIRE COMMANDING OFFICERS OF COAST GUARD CUTTERS OVER 100 FT IN LENGTH TO BROADCAST SECURITE CALL WHEN GETTING UNDERWAY TO INFORM OTHER VESSELS OF THEIR PRESENCE, UNLESS SUCH INFORMATION WOULD NOT BE IN THE INTEREST OF THE NATIONAL SECURITY.

RULES OF THE ROAD - SHIP'S WHISTLE
RECOMMENDATION SUBJECTS
-- AS OF 7/07/81 --

RECOMMENDATION NUMBERS	LOG NUMBERS	SAFETY RECOMMENDATIONS
M-76-013	M-0016	THE COAST GUARD SHOULD CONSIDER AMENDING THE LAW AND REGULATIONS TO SPECIFY MINIMUM PERFORMANCE STANDARDS FOR WHISTLES ON ALL VESSELS PROVIDED WITH THEM IN ACCORDANCE WITH THE APPLICABLE RULES OF THE ROAD, SIMILAR TO THE STANDARDS PROPOSED BY THE INTERNATIONAL ASSOCIATION OF LIGHTHOUSE AUTHORITIES.
M-77-004	M-0053	DEVELOP AND PUBLICIZE INFORMATION ABOUT DEFICIENCIES IN THE USE OF SOUND SIGNALS BETWEEN VESSELS INCLUDING THE EFFECT OF ENVIRONMENTAL CONDITIONS ON SOUND PROPAGATION.
M-79-038	M-0089A	INSURE THAT MARYLAND PILOTS COMPLY WITH SECTION 33 CFR 80.3(A) OF THE PILOT RULES FOR INLAND WATERS WHICH STATES: THE SIGNALS FOR PASSING, BY THE BLOWING OF THE WHISTLE, SHALL BE GIVEN AND ANSWERED BY PILOTS, IN COMPLIANCE WITH THE RULES IN THIS PART, NOT ONLY WHEN MEETING HEAD AND HEAD, OR NEARLY SO, BUT AT ALL TIMES WHEN THE STEAM VESSELS ARE IN SIGHT OF EACH OTHER, WHEN PASSING OR MEETING AT A DISTANCE WITHIN HALF A MILE OF EACH OTHER, AND WHETHER PASSING TO THE STARBOARD OR PORT.
M-80-076	M-0127	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: EMPHASIZE TO ALL COMMANDING OFFICERS OF COAST GUARD CUTTERS THE IMPORTANT OBLIGATION TO SOUND WHISTLE SIGNALS IN ACCORDANCE WITH THE APPROPRIATE RULES OF THE ROAD.

BEST_DOCUMENT_AVAILABLE

RULES OF THE ROAD - NAVIGATION LIGHTS
RECOMMENDATION SUBJECTS
-- AS OF 7/07/81 --

RECOMMENDATION NUMBERS	LOG NUMBERS	SAFETY RECOMMENDATIONS
M-70-010	M-0016	THE COAST GUARD INITIATE ENFORCEMENT ACTION TO INSURE THAT NAVIGATION LIGHTS USED ON BARGES MEET THE REQUIREMENTS OF 46 CFR 113.35-30. SPECIFICATIONS FOR APPROVAL OF BATTERY-OPERATED NAVIGATIONAL LIGHTS SHOULD BE DEVELOPED AND INCLUDED IN 46 CFR 161, AND APPROVED MODELS AND MANUFACTURERS INCLUDED IN COAST GUARD EQUIPMENT LISTS (CG 190). IT APPEARS THAT ENFORCEMENT CAN BEST BE ACCOMPLISHED BY LABORATORY TESTS OF THE MANUFACTURER'S PRODUCTS AT THE MANUFACTURER'S FACILITY.
M-70-011	M-0016	THE COAST GUARD DETERMINE BY NECESSARY LABORATORY TESTS WHETHER THE TYPES OF NAVIGATIONAL LIGHTS USED ON THE BARGE I.O.C. NO. 7 MET THE REQUIREMENTS OF 46 CFR 113.35-30.
M-70-012	M-0016	THE COAST GUARD, IN ITS PRESENT STUDY OF THE VISUAL EFFECTIVENESS OF SHIPBOARD NAVIGATIONAL LIGHTS RELATIVE TO THE LIGHTED BACKGROUND CONDITIONS IN HARBORS AND OTHER DEVELOPED AREAS OF THE INLAND WATERWAYS, INCLUDE THE PROBLEM OF ATTENTION-GETTING AND DEFINITION OF ORIENTATION OF BARGE TOWS. IT IS THE BOARD'S VIEW THAT CHANGES IN REGULATIONS RESULTING FROM THIS STUDY SHOULD PREVENT ANY POSSIBILITY OF UNCERTAINTY AS TO WHAT TYPE OF VESSEL IS SEEN, AND PROVIDE A COMFORTABLE MARGIN OF LIGHT OUTPUT WELL BEYOND THAT WHICH COULD BE SHOWN TO PROVIDE THEORETICALLY THE DESIRED RANGE OF VISIBILITY.
M-71-012	M-0021	STUDY THE EFFECTIVENESS OF NAVIGATION LIGHTS IN DEPICTING THE DIRECTIONAL ASPECT OF MEETING VESSELS, INCLUDING THE NEED FOR RANGE LIGHTS ON SMALLER VESSELS.
M-73-001	M-0031	THE COAST GUARD DEVELOP AND REQUIRE USE OF ILLUMINATION TECHNIQUES FOR BARGES THAT WILL MAKE THEM READILY VISIBLE AND RECOGNIZABLE WHEN PUSHED AHEAD OF TOWBOATS, AS A MINIMUM REQUIREMENT SUCH A SYSTEM SHOULD OUTLINE THE BOUNDARIES OF THE TOW.
M-73-003	M-0031	THE COAST GUARD REQUIRE SUITABLE SIDE-LIGHT ALIGNMENT AND SECURING DEVICES ON THE FRONT OF BARGE TOWS TO INSURE THAT SUCH LIGHT WILL COMPLY WITH THE ALIGNMENT RESTRICTIONS BY THE RULES OF THE ROAD.
M-73-004	M-0031	THE COAST GUARD UPGRADE THE RELIABILITY OF THE NAVIGATION LIGHTS ON BARGE TOWS BY REQUIRING THAT THE CIRCUITS FOR THESE LIGHTS BE AUTOMATICALLY MONITORED TO GIVE AN ALARM IN CASE OF LIGHT FAILURE, AND BY REQUIRING REDUNDANT LIGHTS.
M-80-074	M-0127	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: MODIFY THE LIGHTS ON COAST GUARD BUOYTENDERS TO COMPLY AS CLOSELY AS POSSIBLE TO THE REGULATIONS BY MOVING THE FORWARD MASTHEAD LIGHT AS FAR FORWARD AS POSSIBLE AND RESCIND OR MODIFY THE EXEMPTION FOR COAST GUARD BUOY TENDERS IN APPENDIX B OF 33 CFR SUBCHAPTER D - IMPLEMENTATION AND INTERPRETATION OF THE 72 COLREGS.
M-80-094	M-0134	THE NTSB RECOMMENDS THAT THE SHELL OIL COMPANY/SHELL CHEMICAL COMPANY, AT DEER PARK TEXAS: ESTABLISH MORE EFFECTIVE OPERATIONAL CONTROL OF TUGS AND TOWBOATS RELATIVE TO STANDBY PROCEDURES AND THE MOVEMENT OF ENHANCED TANK VESSELS IN EMERGENCIES.
M-80-101	M-0138A	THE NTSB RECOMMENDS THAT THE AMERICAN WATERWAYS OPERATORS, INC.: NOTIFY MEMBER COMPANIES OF THE AVAILABILITY OF MANUFACTURED PORTABLE BARGE NAVIGATION LIGHTS ACCEPTABLE TO THE U.S. COAST GUARD AS MEETING THE REQUIREMENTS OF THE RULES OF THE ROAD AND OF THE NEED TO USE ONLY SUCH PORTABLE LIGHTS ON THEIR BARGES.

RULES OF THE ROAD - SPEED
RECOMMENDATION SUBJECTS
-- AS OF 7/07/81 --

RECOMMENDATION NUMBERS	LOG NUMBERS	SAFETY RECOMMENDATIONS
M-77-001	M-0053	ESTABLISH GUIDELINES TO DETERMINE THE MAXIMUM SAFE SPEEDS FOR VESSELS THAT ARE NAVIGATING WITH RADAR IN LIMITED VISIBILITY ON INLAND WATERS AND REQUIRE VESSEL OPERATORS TO SET THE VESSEL'S SPEED AT, OR LESS THAN, THE MAXIMUM SAFE SPEED. THE GUIDELINES SHOULD INSURE ADEQUATE TIME FOR PROCESSING RADAR DATA, FOR EVALUATING THE MOVEMENT OF APPROACHING RADAR CONTACTS, AND FOR ESTABLISHING A TIMELY PASSING AGREEMENT. THE GUIDELINES SHOULD RECOGNIZE THE REDUCTION IN PROCESSING TIME ACHIEVED BY ELECTRONIC AND COMPUTER AIDS.
M-70-001	M-0044	EXPEDITE THE SUBMISSION OF THE LEGISLATIVE PROPOSAL AND URGE CONGRESS TO ENACT LEGISLATION, OR AUTHORIZE THE COAST GUARD TO UNDERTAKE RULEMAKING, TO ESTABLISH IN THE NAVIGATION RULES FOR INLAND WATERS A REQUIREMENT FOR VESSELS TO PROCEED AT A SAFE SPEED IDENTICAL TO THE REQUIREMENT ESTABLISHED BY RULE 6 OF THE NEWLY ADOPTED INTERNATIONAL CONVENTION FOR VESSELS ON THE HIGH SEAS WHICH BECAME EFFECTIVE ON JULY 15, 1977.
M-79-002	M-0085	INCLUDE IN ITS ONGOING STUDY OF AIDS TO NAVIGATION SYSTEMS AN ANALYTICAL DETERMINATION OF MAXIMUM SAFE SPEEDS WHICH CAN BE ACCOMMODATED BY SUCH SYSTEMS WHEN EQUATED WITH THE REASONABLE TIME REQUIRED FOR NAVIGATORS TO PERFORM THEIR FUNCTIONS SAFELY.
M-79-003	M-0085	UNDERTAKE FURTHER RESEARCH STUDIES IN COORDINATION WITH THE MARITIME ADMINISTRATION OF THE U.S. DEPARTMENT OF COMMERCE TO DETERMINE ANALYTICALLY IF SPEED LIMITS AND OTHER CONTROLS ARE NECESSARY IN ADDITIONAL RESTRICTED OR CONGESTED WATERWAYS AND CIRCUMSTANCES, AND PRESCRIBE APPROPRIATE MEASURES INDICATED BY SUCH STUDIES.
M-79-004	M-0085A	REVIEW AND REVISE AS NECESSARY APPROPRIATE U.S. NAVY DIRECTIVES AND DOCTRINE APPLICABLE TO NAVIGATION IN RESTRICTED WATERWAYS TO ENSURE THAT COMMANDING OFFICERS OF VESSELS ARE PROVIDED ADEQUATE INFORMATION AND GUIDANCE REGARDING SAFE SPEEDS AND COMMAND RELATIONSHIPS WITH COMMERCIAL PILOTS.
M-79-005	M-0085B	REASSESS THE PRACTICES OF THE ASSOCIATION AND OF MEMBER PILOTS TO ESTABLISH OR REAFFIRM A POLICY THAT EMPHASIZES THE NECESSITY FOR PILOTS TO EXERCISE EXTREME CARE AND EXTRAORDINARY CAUTION, INCLUDING THE USE OF CONSERVATIVE MODERATE SPEEDS, TO PRECLUDE ACCIDENTS INVOLVING VESSELS LADEN WITH CRUDE OIL OR OTHER HAZARDOUS BULK CARGOES.

SHIP DESIGN - HULL AND MECHANICAL MODIFICATIONS
RECOMMENDATION SUBJECTS
-- AS OF 7/07/81 --

RECOMMENDATION NUMBERS	LOG NUMBERS	SAFETY RECOMMENDATIONS
M-70-004	M-0015	THE COAST GUARD CONSIDER AMENDING THE REGULATIONS FOR CARGO VESSELS TO REQUIRE MANUALLY OPERABLE AIR PORTS NOT LESS THAN 16 INCHES IN DIAMETER, OR KICKOUT PANELS, TO PROVIDE AN ADDITIONAL MEANS OF ESCAPE FROM BERTHING COMPARTMENTS LOCATED ABOVE THE MAIN DECK. (THIS RECOMMENDATION WAS PREVIOUSLY MADE FOR TANK VESSELS IN THE GULFSTAG REPORT DATED MAY 29, 1968.)
M-70-005	M-0015	THE COAST GUARD STUDY THE NEED FOR FIRE-RESISTANT LIFEBOAT AND INFLATABLE LIFERAFT COVERS, AND FIRE HOSES.

BEST DOCUMENT AVAILABLE

M-70-013	M-0016	THE COAST GUARD SHOULD CONSIDER AMENDING THE LAW AND REGULATIONS TO SPECIFY MINIMUM PERFORMANCE STANDARDS FOR WHISTLES ON ALL VESSELS PROVIDED WITH THEM IN ACCORDANCE WITH THE APPLICABLE RULES OF THE ROAD, SIMILAR TO THE STANDARDS PROPOSED BY THE INTERNATIONAL ASSOCIATION OF LIGHTHOUSE AUTHORITIES.
M-71-019	M-0022	VESSEL OPERATORS, THE AMERICAN INSTITUTE OF MERCHANT SHIPPING, AND THE SOCIETY OF NAVAL ARCHITECTS AND MARINE ENGINEERS GIVE DUE CONSIDERATION TO THE DEVELOPMENT OF COORDINATED BRIDGE WORKSPACE ARRANGEMENTS AND TASK ASSIGNMENTS IN THE FORMULATION OF VESSEL SPECIFICATIONS AND DESIGNS AS HIGHLIGHTED IN THE RECENT GENERAL DYNAMICS STUDY.
M-74-004	M-0035	DETERMINE THE NEED FOR ANCHORS ON UNMANNED BARGES AND PRACTICAL METHODS OF CONTROLLING SUCH ANCHORS IN ORDER TO PREVENT DAMAGE TO ANY VESSEL, BRIDGE, OR OTHER STRUCTURE, OR OTHER LOSS TO BYSTANDERS ON THE NAVIGABLE WATERS OF THE UNITED STATES.
M-74-017	M-0037	THE COAST GUARD, IN APPROVING SHIP DESIGNS, REQUIRE BETTER VISIBILITY OF THE RUDDER ORDER INDICATOR AND RUDDER ANGLE INDICATOR FROM ALL CONNING POSITIONS.
M-74-018	M-0037	THE MARITIME ADMINISTRATION, IN DEVELOPING AN ADVANCED "INTEGRATED CONNING SYSTEM:" (A) DISPLAY RUDDER ORDER AND RUDDER ANGLE POSITIONS SO AS TO BE VISIBLE FROM ALL CONNING POSITIONS. (B) PROVIDE AN EXPANDED SCALE ON THE COURSE RECORDER FOR USE DURING IN-PORT MANEUVERING. (C) UPGRADE THE QUALITY OF THE AUDIO-RECORDER AND ADD A TIME REFERENCE TRACE. (D) PROVIDE AUTOMATIC RECORDING OF PROPELLER RPM AND SHIP'S SPEED.
M-76-007	M-0047	INITIATE RESEARCH TO DEVELOP A TECHNICAL GUIDE FOR THE DESIGN OF NONPENETRATING SHIPS' BOWS. THE SCOPE OF PROTECTION SOUGHT AS TO VESSEL TYPES AND COLLISION SPEEDS SHOULD BE DETERMINED BY RISK ANALYSIS, BUT SHOULD NOT BE LESS THAN THAT WHICH WOULD PROTECT TYPICAL MODERN TANKERS IN COLLISIONS WITH SIMILAR VESSELS AT A SPEED OF 6 KNOTS.
M-77-005	M-0053	PROHIBIT THE USE OF METALS WITH LOW MELTING POINTS AND OF FIRE-CONSUMABLE GASKETS IN BOTH TANKCOVERS AND DECK PIPING SYSTEMS ON TANK-SHIPS.
M-77-007	M-0054	ESTABLISH GUIDELINES TO PROVIDE FOR THE USE, AT THE EARLIEST POSSIBLE DATE, OF MARINE RADAR INTERROGATION TRANSPONDERS (MRIT) AND COLLISION AVOIDANCE SYSTEMS (CAS) BY VESSELS THAT ARE NAVIGATING BY RADAR ON INLAND WATERS.
M-77-034	M-0058	REQUIRE A RATE OF TURN INDICATOR ON THE BRIDGE OF ALL SHIPS OF 10,000 OR MORE DEADWEIGHT TONS.
M-77-036	M-0058	UNDERTAKE RULEMAKING AND IMCO INITIATIVES TO REQUIRE THAT ANCHORS BE STOWED IN RECESSES IN THE HULL SO THAT THERE IS NO PROJECTION OUTSIDE THE HULL PLATING.
M-78-074	M-0083	REQUIRE VESSELS CARRYING MORE THAN SIX PASSENGERS FOR HIRE AND ENGAGED IN THE OFFSHORE OIL INDUSTRY TO HAVE ELECTRONIC NAVIGATIONAL EQUIPMENT INCLUDING RADAR, LORAN, AND A FATHOMETER.
M-78-078	M-0083	REQUIRE THAT AN ADDITIONAL NUMBER OF LIFE PRESERVERS BE PROVIDED FOR THE PERSONNEL ON WATCH IN THE ENGINEROOM AND PILOTHOUSE AND AT THE BOW LOOKOUT STATION FOR ALL VESSELS CARRYING MORE THAN SIX PASSENGERS FOR HIRE AND ENGAGED IN THE OFFSHORE OIL INDUSTRY, AND REQUIRE THAT THESE ADDITIONAL LIFE PRESERVERS BE STOWED WHERE THEY ARE READILY ACCESSIBLE TO THE PERSONNEL ON WATCH.
M-79-023	M-0088	EVALUATE THE INSTALLATION OF RADAR EQUIPMENT ON COAST GUARD VESSELS AND INSURE THAT INDICATORS ARE SO LOCATED THAT THE EQUIPMENT CAN BE EASILY AND PROPERLY USED BY PERSONNEL ON WATCH IN THE WHEELHOUSE.
M-79-037	M-0080	STUDY THE FEASIBILITY OF USING NONSKID DECKING, GRATING, OR OTHER VEHICLE RESTRAINTS TO MINIMIZE VEHICLE SKIDDING OR SHIFTING ON FERRY DECKS IN THE EVENT OF A COLLISION.
M-79-075	M-0096	THE NTSB RECOMMENDS THAT THE USCG: REQUIRE PERIODIC GAUGING OF BULKHEADS ON BULK CARRIERS THAT ARE MORE THAN 15 YEARS OLD. IN PARTICULAR, THE LOWER PORTIONS OF BULKHEADS IN CARGO HOLDS, BILGE WELLS, SALTWATER BALLAST TANKS, AND MACHINERY SPACES SHOULD BE GAUGED FOR TIMELY RENEWAL DUE TO CORROSION AND WASTAGE.
M-79-088	M-0102	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: AMEND 46 CFR 113.30-5(A) TO ADD PROPULSION LOCAL CONTROL STATIONS TO THOSE LOCATIONS REQUIRED TO BE PROVIDED WITH AN EFFICIENT MEANS OF COMMUNICATIONS IN VESSELS EQUIPPED WITH AUTOMATED CONTROL SYSTEMS.
M-79-089	M-0102	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: AMEND 46 CFR 113.30-20(B) TO PERMIT PROPULSION LOCAL CONTROL STATION TELEPHONES TO BE INSTALLED ON THE SAME CIRCUIT AS THE TELEPHONE STATIONS LISTED IN 46 CFR 113.30-5(A), AND TO REQUIRE SUCH INSTALLATIONS TO MEET THE CRITERIA OF 46 CFR 113.30.25, WITH SPECIAL EMPHASIS ON PARAGRAPHS (C) THROUGH (G) THEREOF IN REGARD TO NOISY LOCATIONS.
M-79-090	M-0102	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: AMEND 46 CFR 113.35-5 TO REQUIRE THE INSTALLATION OF ENGINE ORDER TELEGRAPH SYSTEMS BETWEEN ENGINEROOM CONTROL STATIONS AND PROPULSION LOCAL CONTROL STATIONS IN VESSELS EQUIPPED WITH AUTOMATED CONTROL SYSTEMS IF MANUAL OPERATION IS AN ACCEPTABLE ALTERNATE MEANS OF CONTROL AND THE LOCAL STATION IS NOT IMMEDIATELY ADJACENT TO THE ENGINEROOM CONTROL STATION.
M-79-091	M-0102	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: AMEND 46 CFR 113 TO PRESCRIBE STANDARDS FOR THRUST INDICATORS SIMILAR TO THOSE PRESCRIBED BY 46 CFR 113.40 FOR RUDDER ANGLE INDICATORS AND BY 46 CFR 113.35 FOR ENGINE ORDER TELEGRAPH SYSTEMS. REGULATIONS SHOULD REQUIRE VESSELS OF 1,600 OR MORE TONS TO BE EQUIPPED WITH THRUST INDICATORS WHICH ARE: (1) SEPARATE AND INDEPENDENT FROM SUCH INDICATORS PROVIDED BY AUTOMATED CONTROL CONSOLES, (2) POSITIONED PROMINENTLY NEAR THE RUDDER ANGLE INDICATOR IN THE WHEELHOUSE AND BRIDGE WINGS, AND AT THE ENGINEROOM CONTROL STATION, (3) ILLUMINATED APPROPRIATELY FOR EFFECTIVE DAY AND NIGHT VISIBILITY, AND (4) DESIGNED TO DISPLAY THE EXACT SHAFT RPM AND PROPELLER PITCH DIRECTION IN EITHER COMBINED OR INDIVIDUAL INSTRUMENTS.
M-79-092	M-0102	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: INITIATE APPROPRIATE PROPOSALS TO THE INTERGOVERNMENTAL MARITIME CONSULTATIVE ORGANIZATION FOR THE ESTABLISHMENT OF INTERNATIONAL STANDARDS SIMILAR TO THOSE PRESCRIBED BY 46 CFR 113 AS REVISED PURSUANT TO THE PRECEDING FOUR RECOMMENDATIONS.
M-79-093	M-0102	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: AMEND 33 CFR 164.35 TO ADD ILLUMINATED SHAFT RPM INDICATORS TO THE EQUIPMENT REQUIRED IN THE WHEELHOUSE, AND ILLUMINATED THRUST DIRECTION INDICATORS IN THE WHEELHOUSE AND ON THE BRIDGE WINGS OF VESSELS EQUIPPED WITH CONTROLLABLE-PITCH PROPELLERS.

BEST DOCUMENT AVAILABLE

M-79-098	M-0163	THE NTSB RECOMMENDS THAT THE U.S. NAVY MILITARY SEALIFT COMMAND: COLLABORATE WITH THE U.S. COAST GUARD TO MAKE A SPECIAL EVALUATION TO DETERMINE THE DEFICIENCIES INVOLVED IN MAINTAINING THE AUTOMATED CONTROL SYSTEM OF THE SEALIFT CHINA SEA AND THE OTHER EIGHT VESSELS OF THAT CLASS AND MAKE THE CHANGES IN MANNING AND EQUIPMENT NEEDED TO ACHIEVE AND ADEQUATE DEGREE OF MAINTAINABILITY ONBOARD THOSE VESSELS.
M-80-032	M-0119	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: SEEK INTERNATIONAL AGREEMENT TO REQUIRE ALL SHIPS OF MORE THAN 500 GROSS TONS TO USE NONCOMBUSTIBLE MATERIALS IN THE CONSTRUCTION OF ACCOMMODATION SPACES.

SHIP DESIGN - STEERING GEAR RELIABILITY
RECOMMENDATION SUBJECTS
-- AS OF 7/07/81 --

RECOMMENDATION NUMBERS	LOG NUMBERS	SAFETY RECOMMENDATIONS
M-76-001	M-0047	REVISE ITS INTERPRETATION OF 46 CFR 58.25-55, WHICH REQUIRES SEPARATE AND INDEPENDENT STEERING CONTROLS TO PREVENT THE USE OF A SINGLE CONTROL PATH UP TO THE STEERING POWER UNITS AS WAS DONE ON THE SEA WITCH.
M-76-002	M-0047	ESTABLISH A REQUIREMENT FOR OCEANGOING VESSELS IN DESIGNATED RESTRICTED WATERS SUCH AS NEW YORK HARBOR TO HAVE THE EMERGENCY STEERING STATION MANNED. THIS ALSO SHOULD APPLY TO FOREIGN VESSELS.
M-76-003	M-0047	REQUIRE ALL STEERING FAILURES ABOARD U.S. OCEANGOING VESSELS TO BE REPORTED TO THE COAST GUARD. SUCH FAILURES ABOARD FOREIGN VESSELS ALSO SHOULD BE REPORTED IF THE FAILURE OCCURS IN U.S. WATERS.
M-76-004	M-0047	REQUIRE THAT THE EMERGENCY GENERATOR ON FUTURE U.S. VESSELS PROVIDE POWER TO THE STEERING GEAR UPON LOSS OF A SHIP'S NORMAL ELECTRIC POWER.
M-76-005	M-0047	REQUIRE ALL U.S. OCEANGOING VESSELS TO ESTABLISH WRITTEN EMERGENCY PROCEDURES AND ALARMS FOR LOSS OF STEERING CONTROL. EMERGENCY DRILLS FOR LOSS OF STEERING CONTROL SHOULD BE REQUIRED AND LOGGED.
M-76-006	M-0047	INCLUDE, AS PART OF ITS SPEED LIMIT STIPULATIONS FOR LARGE VESSELS TRANSITING NEW YORK HARBOR, A REQUIREMENT THAT ANY VESSEL WHICH LOSES STEERING CONTROL SHALL IMMEDIATELY STOP OR SLOW, AND ANCHOR AS SOON AS IT IS SAFE TO DO SO.
M-77-008	M-0052	AMEND 46 CFR 111.60-70(F)(1) AND (2) TO REQUIRE THE INSTALLATION OF A PILOT LIGHT AND AN AUDIBLE ALARM TO INDICATE POWER INTERRUPTION TO STEERING GEAR MOTORS IN THE WHEELHOUSE INDEPENDENT OF, AND IN ADDITION TO, THOSE CURRENTLY REQUIRED TO DO INDICATE AT THE PROPULSION CONTROL STATION.
M-77-009	M-0052	AMEND 46 CFR 111.01 AND 111.90 TO MAKE THE PROVISIONS OF 46 CFR 111.60-70(C)(2) AND 111.60-70(E) APPLICABLE TO VESSELS EQUIPPED WITH ELECTRIC-POWERED STEERING GEAR AND CONTRACTED FOR PRIOR TO NOVEMBER 1ST, 1952, WHICH WOULD REQUIRE THE REMOVAL OF MOTOR-RUNNING PROTECTIVE DEVICES; THE INSTALLATION OF PROTECTIVE DEVICES RESPONSIVE TO MOTOR CURRENT, TEMPERATURE, OR BOTH; AND THE INSTALLATION OF INTERLOCKS TO PREVENT BOTH STEERING SYSTEMS FROM BEING CONNECTED TO THE SAME FEEDER CIRCUIT SIMULTANEOUSLY.
M-77-010	M-0052	AMEND 46 CFR 35.20-10, 78.17-15, AND 97.15-3 AND 33 CFR 164.25 TO REQUIRE ADDITIONAL SPECIFIC STEERING GEAR TESTS, INCLUDING THE SWITCHING FROM ONE STEERING GEAR CONTROL SYSTEM TO THE OTHER, FROM HYDRAULIC CONTROL TO ELECTRICAL CONTROL AND BACK; FROM ONE SOURCE OF ELECTRIC POWER FOR THE STEERING MOTORS TO THE OTHER AND BACK; AND THE ACTIVATION OF ALARM SYSTEMS BY SIMULATION OF POWER INTERRUPTION TO EACH OF THE STEERING MOTORS.
M-77-011	M-0052	AMEND REGULATIONS TO REQUIRE THE UPGRADING TO MEET CURRENT STANDARDS OF ALL SYSTEMS VITAL NOT ONLY TO ONBOARD SAFETY BUT ALSO TO VESSEL CONTROL WHENEVER AN OCEANGOING VESSEL IS MODERNIZED, LENGTHENED, REBUILT, OR CONVERTED TO ANOTHER SERVICE.
M-77-012	M-0052	UNDERTAKE FURTHER RULEMAKING TO AMEND 33 CFR 164.15 TO REQUIRE, WHEN STEERING GEAR ROOMS ARE REQUIRED TO BE MANNED, THAT THE PERSONS ASSIGNED ARE COMPETENT AND TRAINED TO SWITCH THE STEERING GEAR TO ALL ALTERNATE MODES AND CONTROL SYSTEMS, AND TO REQUIRE THAT THE PERSON MANNING THE STEERING ENGINEROOM IS IN COMMUNICATION WITH THE WHEELHOUSE.
M-77-013	M-0052	MAKE A SPECIAL ONE-TIME INSPECTION OF MANUAL TRANSFER SWITCH INSTALLATIONS, SUCH AS THAT FOUND IN THE MARINE FLORIDIAN, ON A REPRESENTATIVE NUMBER OF VESSELS; AND, BASED ON THE FINDINGS, CHANGE STEERING GEAR INSPECTION PROCEDURES TO ASSURE THAT MECHANICAL FAULTS IN THE ELECTRICAL SYSTEM ARE IDENTIFIED AND CORRECTED DURING FUTURE PERIODIC INSPECTIONS.
M-77-014	M-0052	DETERMINE, IN VESSELS WHICH HAVE ELECTRIC AND HYDRAULIC COMPONENTS INSTALLED SO THAT BOTH STEERING MOTORS CAN BE OPERATED SIMULTANEOUSLY, WHETHER SUCH OPERATION WOULD PROVIDE A SAFE AND VIABLE DUAL CAPACITY WITHOUT RISK OF CAUSING A FAILURE TO SOME COMPONENT OF THE STEERING GEAR. IF SUCH OPERATION IS FOUND TO BE SAFE, REQUIRE THE OPERATION OF BOTH MOTORS BY VESSELS SO EQUIPPED WHILE THEY ARE UNDERWAY IN RESTRICTED OR CONGESTED WATERS TO INSURE THAT STEERING IS NOT LOST EVEN THOUGH ONE MOTOR FAILS TO FUNCTION.
M-78-079	M-0079	AMEND THE PROPOSED STEERING STANDARDS FOR TANKSHIPS TO REDUCE THE TIME ALLOWED FOR ALARMS TO ALERT THE CREW OF A FAILURE AND TO REDUCE THE TIME ALLOWED TO RESTORE STEERING CONTROL, AND MAKE THESE REQUIREMENTS APPLICABLE TO ALL SEA-GOING VESSELS ENTERING U.S. NAVIGABLE WATERS.
M-78-080	M-0079	INITIATE ACTION THROUGH THE INTER-GOVERNMENTAL MARITIME CONSULTATIVE ORGANIZATION TO DEVELOP A PROGRAM TO INSURE THAT OWNERS, OPERATORS, CREWMEN, AND INSPECTORS ARE MADE AWARE OF THE IMPORTANCE OF A VESSEL'S STEERING GEAR AND THE IMPORTANCE OF PROPER MAINTENANCE OF THIS EQUIPMENT.
M-78-081	M-0079	AMEND 46 CFR 58.25 AND 33 CFR 164 TO REQUIRE THAT ALL VESSELS BE EQUIPPED WITH TEST DEVICES WHICH WILL INDICATE WHETHER THE STEERING GEAR IS OPERATING PROPERLY AND TO REQUIRE THAT OPERATING PARAMETERS, TEST PROCEDURES, AND MAINTENANCE RECORDS BE MADE AVAILABLE TO CREWMEMBERS AND INSPECTORS DURING INSPECTIONS AND TESTS, INCLUDING THOSE REQUIRED BY 46 CFR 35.20-10, 78.17-15, AND 97.15-3, AND BY 33 CFR 164.25, SO THAT PROPER EVALUATIONS CAN BE MADE REGARDING THE MACHINERY'S OPERATION.
M-78-083	M-0079	DETERMINE WHICH VESSELS ENTERING U.S. WATERS ARE FITTED WITH THE SAME TYPE STEERING GEAR INSTALLED ON THE SITALA. REQUIRE TESTING OF THE INSTALLED CAST-IRON DIFFERENTIAL CONTROLLER FOUNDATION TO DETERMINE IF DEFECTS SIMILAR TO THOSE DETECTED ON THE SITALA ARE PRESENT, AND REPORT THE FINDINGS.

BEST DOCUMENT AVAILABLE

M-70-004	M-0079	EXPAND THE FOREIGN VESSEL BOARDING PROGRAM WITH RESPECT TO STEERING GEAR INSPECTIONS TO DETERMINE THE ADEQUACY OF CURRENT MAINTENANCE PRACTICES AND REPORT THE FINDINGS.
M-70-005	M-0079	EXPAND THE U.S. GOVERNMENT'S EFFORT THROUGH THE INTER-GOVERNMENTAL MARITIME CONSULTATIVE ORGANIZATION TO OBTAIN MORE COMPREHENSIVE AND MORE UNIFORM ANNUAL SURVEYS OF MERCHANT VESSELS OF ALL TYPES RATHER THAN JUST TANKSHIPS.
M-80-030	M-0119	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: MAKE THE REQUIREMENT FOR TWO SEPARATE AND INDEPENDENT STEERING GEAR CONTROL SYSTEMS ON CARGO VESSELS A UNITED STATES PRIORITY ITEM AT MEETINGS OF THE INTERGOVERNMENTAL MARITIME CONSULTATIVE ORGANIZATION.
M-80-042	M-0120	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: REQUIRE EACH SELF-PROPELLED VESSEL OF 1,600 GROSS TONS OR GREATER NAVIGATING IN CONFINED OR CONGESTED WATERS OF THE UNITED STATES TO HAVE OPERATING INSTRUCTIONS AND A BLOCK DIAGRAM THAT CLEARLY AND SIMPLY EXPLAIN THE CHANGEOVER PROCEDURES FOR THE REMOTE STEERING GEAR CONTROL SYSTEMS AND STEERING GEAR POWER UNITS ON THE VESSEL. THE INSTRUCTIONS AND BLOCK DIAGRAM SHOULD BE PERMANENTLY DISPLAYED BOTH ON THE NAVIGATION BRIDGE AND IN THE STEERING ENGINEROOM.

SHIP DESIGN - SHIP DATA RECORDERS
RECOMMENDATION SUBJECTS
-- AS OF 7/07/81 --

RECOMMENDATION NUMBERS	LOG NUMBERS	SAFETY RECOMMENDATIONS
M-76-008	M-0047	REQUIRE THE INSTALLATION OF AN AUTOMATIC RECORDING DEVICE TO PRESERVE VITAL NAVIGATIONAL INFORMATION ABOARD OCEANGOING TANKSHIPS AND CONTAINERSHIPS.
M-78-002	M-0066	CONDUCT A FORMAL STUDY IN COORDINATION WITH THE FEDERAL MARITIME ADMINISTRATION AND THE SHIPPING INDUSTRY TO DETERMINE A STANDARD ARRAY OF OPERATIONAL AND AUDIO DATA THAT SHOULD BE RECORDED AUTOMATICALLY WITH A VIEW TO ESTABLISHING A REQUIREMENT FOR THE INSTALLATION AND OPERATION OF SUITABLE EQUIPMENT IN U.S. VESSELS OVER 1,600 GROSS TONS BUILT AFTER 1965, AND TO SUBMITTING AN INITIATIVE TO INTER-GOVERNMENTAL MARITIME CONSULTATIVE ORGANIZATION (IMCO) FOR THE ADOPTION OF A SIMILAR INTERNATIONAL REQUIREMENT.

NAVIGATION AIDS - VESSEL TRAFFIC SERVICE
RECOMMENDATION SUBJECTS
-- AS OF 7/07/81 --

RECOMMENDATION NUMBERS	LOG NUMBERS	SAFETY RECOMMENDATIONS
M-71-015	M-0022	CONGRESS ENACT LEGISLATION SUCH AS THE PROPOSED "PORTS AND WATERWAYS SAFETY ACT OF 1971" (H.R. 8140) WHICH WOULD PROVIDE EXPLICIT STATUTORY AUTHORITY FOR THE U.S. COAST GUARD TO ESTABLISH AND OPERATE MARINE TRAFFIC REGULATION SYSTEMS IN THE CONGESTED PORT WATERS OF THE UNITED STATES.
M-71-016	M-0022	THE COAST GUARD CONTINUE TO DEVELOP THE MARINE TRAFFIC SYSTEM IN SAN FRANCISCO BAY. SUCCESSFUL DEVELOPMENT OF THIS SYSTEM SHOULD LEAD TO THE EVENTUAL ESTABLISHMENT OF SIMILAR EFFECTIVE SYSTEMS IN OTHER CONGESTED PORTS AND WATERWAYS IN THE UNITED STATES.
M-71-017	M-0022	THE COAST GUARD STUDY THE FEASIBILITY OF DEVELOPING A METHOD OF TRAFFIC SEPARATION FOR INBOUND AND OUTBOUND TRAFFIC IN THE GOLDEN GATE CHANNEL.
M-74-001	M-0035	EXPEDITE THE PROMULGATION OF REGULATIONS REGARDING VESSEL CONTROL IN THE VICINITY OF THE CHESAPEAKE BAY BRIDGE AND TUNNEL.
M-77-002	M-0053	DETERMINE THE MAXIMUM STRENGTH OF A CURRENT WHICH LEADS TO THE MANDATING OF ONE-WAY TRAFFIC FOR VESSELS THAT ARE NAVIGATING BY RADAR IN LIMITED VISIBILITY ON INLAND WATERS, AND REQUIRE THE VESSEL TRAFFIC SERVICE TO MANDATE ONE-WAY TRAFFIC WHEN THE STRENGTH OF THE CURRENT EXCEEDS THE MAXIMUM STRENGTH.
M-79-058	M-0093	REEVALUATE THE PROPOSED LEVEL OF VESSEL TRAFFIC SERVICE (VTS) IN THE CHESAPEAKE BAY, AND DETERMINE IF AN ACTIVE, MANNED SYSTEM IS MORE APPROPRIATE BECAUSE OF THE INCREASED TRAFFIC DENSITY AND THE TRANSIT OF VESSELS TRANSPORTING LIQUEFIED NATURAL GAS (LNG) AND OTHER HAZARDOUS CARGOES.
M-79-059	M-0084	INSTITUTE MANDATORY PARTICIPATION IN THE VTS ON THE HOUSTON SHIP CHANNEL.
M-79-060	M-0084	DESIGNATE CROWN POINT BEND AS A VTS PRECAUTIONARY AREA AND RESTRICT VESSELS PASSING AT THE BEND.
M-79-061	M-0084	DEVELOP VESSEL MANEUVERING GUIDELINES FOR VTS AND PILOT USE ON THE HOUSTON SHIP CHANNEL CONCERNING VESSEL SIZE, DRAFT, AND SPEED, IN RELATION TO CHANNEL WIDTH, DEPTH, AND CONFIGURATION.
M-79-066	M-0084	SURVEY TERMINAL FACILITIES ALONG THE HOUSTON SHIP CHANNEL TO DETERMINE THE EXTENT OF DAMAGE THAT HAS BEEN CAUSED BY VESSEL SPEEDS AND MANEUVERING ACCIDENTS, AND INSTITUTE NECESSARY VTS CONTROLS TO ELIMINATE SPEED/MANEUVERING PROBLEMS.
M-79-073	M-0096	THE NTSB RECOMMENDS THAT THE USCG: PROPOSE TO THE INTERGOVERNMENTAL MARITIME CONSULTATIVE ORGANIZATION THAT A STUDY BE INITIATED TO DETERMINE THE NEED FOR ESTABLISHING AN EFFECTIVE VESSEL TRAFFIC SERVICE AT THE EAST END OF THE STRAIT OF GIBRALTAR TO IMPROVE THE SAFETY IN THIS HEAVILY TRAFFICKED AREA.
M-79-079	M-0101	THE NTSB RECOMMENDS THAT THE USCG: ESTABLISH AN ACTIVE, MANNED VESSEL TRAFFIC SERVICE (VTS) AT THE ENTRANCE OF THE CHESAPEAKE BAY. THIS VTS SHOULD NOT ONLY ADVISE VESSELS OF TRAFFIC CONDITIONS BUT ALSO EXERCISE CONTROL OVER THEIR MOVEMENTS. PARTICIPATION IN THE VTS SHOULD BE MANDATORY.
M-79-103	M-0106	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: EXPEDITE THE INSTALLATION OF VESSEL SURVEILLANCE SYSTEMS AND INSTITUTE MANDATORY PARTICIPATION IN THE VESSEL TRAFFIC SERVICE FOR THE MISSISSIPPI RIVER NEAR ALGIERS POINT.
M-79-104	M-0106	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: AS AN INTERIM MEASURE PENDING INSTALLATION OF VESSEL SURVEILLANCE SYSTEMS FOR THE VESSEL TRAFFIC SERVICE, OPERATE THE ALGIERS POINT TRAFFIC LIGHTS CONTINUOUSLY.
M-79-112	M-0097	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: ISSUE A REGULATION TO PROHIBIT DEEP-DRAFT VESSELS OVERTAKING OR MEETING EACH OTHER AT THE BENDS IN THE CHANNELS WHEN TRAVERSING THE GALVESTON-HOUSTON SHIP CHANNEL.

BEST DOCUMENT AVAILABLE

M-80-009	M-0109	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: DETERMINE WHICH BENDS ON THE LOWER MISSISSIPPI RIVER PRESENT DIFFICULT NAVIGATIONAL PROBLEMS AND SHOULD BE LIMITED TO ONE-WAY TRAFFIC DURING CONDITIONS OF REDUCED VISIBILITY, AND PROMULGATE APPROPRIATE RESTRICTIONS.
M-80-011	M-0109	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: ACCELERATE RULEMAKING, DOCKET NO. 75-112, TO MAKE PARTICIPATION IN THE NEW ORLEANS VESSEL TRAFFIC SERVICE MANDATORY.
M-80-012	M-0109	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: DEVELOP AND IMPLEMENT A PLAN OF ACTION FOR THE CAPTAIN OF THE PORT OF NEW ORLEANS AND THE NEW ORLEANS VESSEL TRAFFIC CENTER THAT WILL INSURE PROMPT ACTION TO CONTROL TRAFFIC MOVEMENTS ON THE LOWER MISSISSIPPI RIVER DURING CONDITIONS OF LIMITED VISIBILITY.
M-80-013	M-0109	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: RE-EVALUATE THE PROPOSED LEVEL OF VESSEL TRAFFIC SERVICE (VTS) ON THE LOWER MISSISSIPPI RIVER, AND DETERMINE IF AN EXTENDED SURVEILLANCE SYSTEM IS NEEDED TO OVERCOME THE SEVERE LIMITATIONS OF THE PRESENT VTS TO PROVIDE USEFUL, ACCURATE INFORMATION TO PARTICIPANTS.
M-80-016	M-0110	THE NTSB RECOMMENDS THAT THE CRESCENT RIVER PORT PILOT ASSOCIATION: PROMULGATE A POLICY THAT MEMBER PILOTS PARTICIPATE IN THE NEW ORLEANS VESSEL TRAFFIC SERVICE TO IMPROVE ITS LEVEL OF EFFECTIVENESS AND RELIABILITY.
M-80-021	M-0115	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: EXPEDITE THE ISSUANCE OF THE NOTICE OF PROPOSED RULEMAKING TO CODIFY THE BERWICK BAY VESSEL TRAFFIC SERVICE OPERATING PROCEDURES.
M-80-036	M-0125	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: CONDUCT A REVIEW IN COORDINATION WITH THE U.S. ARMY CORPS OF ENGINEERS (COE) AND THE SABINE PILOTS OF THE "VOLUNTARY TRAFFIC CONTROL AGREEMENT OF THE MARITIME INDUSTRY OF THE SABINE WATERWAYS" CONCERNING THE APPARENT DIFFERENCES BETWEEN THE "AGREEMENT" CRITERIA AND THE COE REPORT NO. 3 CONCERNING THE MANEUVERING OF LARGE AND DEEP-DRAFT VESSELS IN RESTRICTED CHANNELS. IF NECESSARY, DEVELOP REVISED VESSEL PASSING AND MANEUVERING GUIDELINES FOR THE SABINE-NECHES WATERWAYS, TAKING INTO CONSIDERATION VESSEL SIZE, DRAFT, AND SPEED IN RELATION TO CHANNEL WIDTH, DEPTH, AND CONFIGURATION OF THE WATERWAYS. INCLUDE IN THE AGREEMENT A SECTION ON COMMUNICATIONS PROCEDURES.
M-80-075	M-0127	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: PROHIBIT SHIPS FROM MEETING IN BENDS IN TAMPA BAY.
M-80-076	M-0127	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: REEVALUATE THE PROPOSED LEVEL OF VESSEL TRAFFIC SERVICE (VTS) IN TAMPA BAY AND DETERMINE IF A HIGHER LEVEL OF VTS IS NEEDED.

NAVIGATION AIDS - RADAR
RECOMMENDATION SUBJECTS
-- AS OF 7/07/81 --

RECOMMENDATION NUMBERS	LOG NUMBERS	SAFETY RECOMMENDATIONS
M-70-009	M-0016	THE AMERICAN PILOTS' ASSOCIATION ESTABLISH A POLICY WHEREBY THEIR MEMBER PILOTS WILL REQUEST MASTERS OF VESSELS WHICH THEY ARE PILOTING TO ARRANGE FOR THE MONITORING OF SHIP'S RADAR, WHEN AVAILABLE, TO ASSIST IN COLLISION AVOIDANCE, EVEN UNDER CONDITIONS OF GOOD VISIBILITY.
M-71-018	M-0022	THE RADIO TECHNICAL COMMISSION FOR MARINE SERVICES ACTIVELY SUPPORT AND ENCOURAGE THE MARITIME AND ELECTRONIC INDUSTRIES' EFFORTS TO DEVELOP AND UTILIZE COLLISION-AVOIDANCE SYSTEMS.
M-77-003	M-0053	ESTABLISH MINIMUM STANDARDS FOR MANUALLY PROCESSING RADAR DATA THAT WILL ASSIST IN EVALUATING THE MOVEMENTS OF APPROACHING RADAR CONTACTS ON INLAND WATERS, AND REQUIRE VESSEL OPERATORS TO INSURE THAT RADAR DATA IS PROCESSED IN ACCORDANCE WITH THE STANDARDS UNLESS A COLLISION AVOIDANCE SYSTEM IS IN USE.
M-79-024	M-0080	ESTABLISH A POLICY CONCERNING THE USE OF RADAR EQUIPMENT AND THE PLOTTING OF RADAR DATA.

NAVIGATION AIDS - CHARTS/DATA
RECOMMENDATION SUBJECTS
-- AS OF 7/07/81 --

RECOMMENDATION NUMBERS	LOG NUMBERS	SAFETY RECOMMENDATIONS
M-79-036	M-0080	COORDINATE ACTION WITH THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION AND THE CORPS OF ENGINEERS, DEPARTMENT OF THE ARMY TO USE GREATER GRAPHIC EMPHASIS IN ILLUSTRATION FERRY CROSSINGS ON CHARTS, AND INCLUDE THE USE OF TEXT "CAUTION--FERRY CROSSING" OR SIMILAR WARNING TO ALERT CHANNEL-BOUND VESSELS OF SUCH CROSSINGS.
M-80-010	M-0109	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: REQUIRE THE NEW ORLEANS VESSEL TRAFFIC CENTER TO INFORM PARTICIPATING VESSELS ROUTINELY OF IMPORTANT WEATHER INFORMATION, SUCH AS DENSE FOG, AND WITHDRAW THE CURRENT INSTRUCTIONS WHICH REQUIRE VESSELS TO REQUEST SUCH INFORMATION SPECIFICALLY.
M-80-019	M-0115	THE NTSB RECOMMENDS THAT THE U.S. COAST GUARD: IMPROVE NAVIGATIONAL AIDS FOR VESSELS TRANSITING THE BERWICK BAY BRIDGES.

*U.S. GOVERNMENT PRINTING OFFICE : 1981 O-361-878/76

BEST DOCUMENT AVAILABLE